PhD in Physical Education and Exercise Science

982. Topics in Physical Education and Exercise Science (MTC)
Fall, Spring, Summer. 2 to 3 credits. A student may earn a maximum of 9 credits in all enrollments for this course.
Selected topics in areas such as physiology of exercise, biomechanics, motor behavior, psychosocial aspects of activity, program design and evaluation, and athletic training.

980. Independent Study in Physical Education and Exercise Science
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
R: Open only to master's students. Approval of department. Individual study in an area of physical education and exercise science under faculty supervision.

983. Internship in Physical Education and Exercise Science
Fall, Spring, Summer. 2 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
Supervised internship in sports medicine, athletic administration, coaching, or education agencies. Capstone experience option in master's degree program.

984. Field Experiences in Physical Education and Exercise Science
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
R: Open only to graduate students in Physical Education and Exercise Science.
Supervised internship in sports medicine, athletic administration, coaching, or education agencies. Capstone experience option in master's degree program.

985. Research Ethics
Summer. 1(1-0) Interdepartmental with Teacher Education; Counseling, Educational Psychology and Special Education; and Educational Administration.
R: Open only to graduate students in the Department of Counseling, Educational Psychology and Special Education or Department of Educational Administration or Department of Physical Education and Exercise Science or Department of Teacher Education.
Identifying and resolving ethical problems in research, including issues related to collegial interactions; authorship, publication, and reviewing practices; data management; ownership of data and intellectual property; conflicts of interest; protection of human and animal subjects; and lab safety and compliance.

987. Project in Physical Education and Exercise Science
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course.
R: Open only to graduate students in Physical Education and Exercise Science.
Project experience under the guidance and supervision of an MSU faculty. Development of products such as technical reports, instructional media, or curriculum materials to address an educationally significant problem. Capstone experience option in master's degree program.

989. Master's Thesis Research
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
P: PES 871.

910. Current Issues in Exercise Physiology
Spring. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course.
P: PES 810.
Selected issues in exercise physiology and related fields of study.

930. Current Issues in Biomechanical Aspects of Physical Activity
Spring. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. Interdepartmental with Osteopathic Manipulative Medicine. P: PES 830.
Selected issues of biomechanical analyses of sport and physical activity.

940. Current Issues in Psychosocial Aspects of Physical Activity
Fall. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. Selected issues in the psychology and sociology of sport and physical activity.

950. Current Issues in the Design and Evaluation of Physical Activity Programs
Fall. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. Selected issues in the design and evaluation of physical activity programs.

960. Current Issues in Motor Behavior
Spring. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. P: PES 860.
Selected issues in motor development, motor learning, adapted physical education, and related fields of study.

990. Independent Study in Physical Education and Exercise Science
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
R: Open only to doctoral students. Approval of department. Individual study in an area of physical education and exercise science under faculty supervision.

995. Research Practicum in Physical Education and Exercise Science
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course.
R: Open only to doctoral students in College of Education. Approval of department. Supervised research practicum. Design, execution, analysis, presentation, critique, and revision of research projects.

999. Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 36 credits in all enrollments for this course.
R: Open only to doctoral students.

PhD in Physical Medicine and Rehabilitation

590. Special Problems
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 24 credits in all enrollments for this course.
Each student works under faculty direction on an experimental, theoretical, or applied problem in physical medicine and rehabilitation.

PHYSICS

Department of Physics and Astronomy
College of Natural Science

101. Concepts in Physics
Fall. (1-0)
Conceptual foundations of physics emphasizing key experiments.

102. Physics Computations I
Spring. 1(1-0)
P: CPS 101 or PHY 183 or PHY 183H or PHY 193H or concurrently.
Use of computer software to solve, analyze and graph equations and data from mechanics.

170. Investigations in Physics
Fall. 3 credits.
R: Approval of department.
Experiments in optics, electronics, sound and mechanics; analysis of data using computers, library research and oral presentations.

181B. Basic Physics I, CBI
Fall, Spring, Summer. 3 credits.
P: MTH 182 or concurrently. R: Not open to students with credit in LBS 164 or PHY 183 or PHY 183H or PHY 193H or PHY 231 or PHY 233B.
Newton's laws of motion, conservation of angular momentum, energy conservation, thermal physics, waves, and sound. Competency based instruction.

182B. Basic Physics II, CBI
Fall, Spring, Summer. 3 credits.
P: LBS 164 or PHY 181B or PHY 183 or PHY 183B or PHY 190H or PHY 234 or PHY 231B. R: Not open to students with credit in LBS 267 or PHY 184 or PHY 184K or PHY 223 or PHY 223B or PHY 224H.
Electricity and magnetism, optical phenomena, interference and diffraction of light, atomic and subatomic topics. Competency based instruction.

183. Physics for Scientists and Engineers I
Fall, Spring, 4(5-0)
P: MTH 182 or concurrently. R: Not open to students with credit in PHY 183 or PHY 183B or PHY 193H or PHY 231 or PHY 231B or LBS 164.
Mechanics, Newton's laws, momentum, energy conservation laws, rotational motion, oscillation, gravity, waves.

185A. Physics I, CBI
Fall, Spring, Summer. 1 credit.
P: PHY 181B or PHY 183 or PHY 183B or PHY 183H or PHY 193H or LBS 164.
Topics from frames of reference, special relativity, rocket equation, forced oscillations, resonances, fluid motion, numerical solutions, moments of inertia, gyroscopic motion. This course plus PHY 181B is equal to PHY 183B.

185B. Physics for Scientists and Engineers II
Fall, Spring, 4(5-0)
P: PHY 181B or PHY 183 or PHY 183B or PHY 183H or PHY 193H or LBS 164; MTH 133 or concurrently. R: Not open to students with credit in LBS 267 or PHY 182 or PHY 184B or PHY 222 or PHY 223B or PHY 294H.
Electricity and magnetism, electromagnetic waves, light and optics, interference and diffraction.

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