

Descriptions — Philosophy of Courses

490. Independent Study
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 9 credits in all enrollments for this course.

R: Approval of department.

Supervised special projects arranged by an individual student and a faculty member in areas supplementing regular course offerings.

491. Special Topics in Philosophy
Fall, Spring, Summer. 3 to 4 credits. A student may earn a maximum of 9 credits in all enrollments for this course.

Special topics supplementing regular course offerings, proposed by faculty on a group study basis.

492. Seminar for Majors

Fall, 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course.

P: 16 credits in Philosophy. R: Open only to majors in Philosophy or approval of department.

Advanced, variable topic seminar for undergraduate majors. Seminar presentations. Substantial paper.

499. Senior Thesis Research

Fall, Spring. 3 credits.

R: Approval of department.

Individual research project supervised by a faculty member that demonstrates the student's ability to do independent research and submit or present a major paper.

810. Seminar in the History of Philosophy

Fall. 2 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open only to graduate students in Philosophy or approval of department.

Major thinkers, themes, periods, or movements in the history of philosophy.

820. Seminar in Continental Philosophy

Fall of even-numbered years. 2 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course.

R: Open only to graduate students in Philosophy or approval of department.

Major figures or themes in 19th and 20th century continental philosophy.

830. Seminar in Logic and the Philosophy of Language

Fall of odd-numbered years. 2 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course.

R: Open only to graduate students in Philosophy or approval of department.

Selected topic in philosophy of language, philosophical logic, and metatheory.

840. Seminar in Value Theory

Spring. 2 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course.

R: Open only to graduate students in Philosophy or approval of department.

Major figures, themes, or periods in ethics or aesthetics. Topics vary.

850. Seminar in Social and Political Philosophy

Spring of even-numbered years. 2 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course.

R: Open only to graduate students in Philosophy or approval of department.

Major figures, themes, or periods in social and political philosophy. Topics vary.

860. Seminar in Metaphysics and Epistemology

Fall. 2 to 4 credits. A student may earn a maximum of 15 credits in all enrollments for this course.

R: Open only to graduate students in Philosophy or approval of department.

Selected topics in metaphysics, epistemology, and philosophy of mind.

870. Seminar in Philosophy of Health Care

Fall. 2 to 4 credits. A student may earn a maximum of 15 credits in all enrollments for this course.

R: Open only to graduate students in Philosophy or approval of department.

Ethical, political, theoretical, and methodological issues in medicine and health care.

880. Seminar in Philosophy of Science

Spring. 2 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course.

R: Open only to graduate students in Philosophy or approval of department.

Selected topics in the philosophy of the special sciences, in the metatheory of science, and in the social studies of science.

890. Independent Study

Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 20 credits in all enrollments for this course.

R: Approval of department.

Special projects, directed reading, and research arranged by an individual graduate student and a faculty member in areas supplementing regular course offerings.

894. Practicum in Philosophy of Health Care

Spring of odd-numbered years. 4 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

P: PHL 344. R: Open only to doctoral students in Philosophy or approval of department.

Study of ethical and policy issues in hospital and governmental agency settings.

899. Master's Thesis Research

Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

R: Approval of department.

Directed research leading to a master's thesis in partial fulfillment of Plan A master's degree requirements.

999. Doctoral Dissertation Research

Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 50 credits in all enrollments for this course.

R: Approval of department.

PHYSICAL EDUCATION AND EXERCISE SCIENCE PES

Department of Physical Education and Exercise Science College of Education

101. Aquatics

Fall, Spring, Summer. 1(0-2)

R: A student may earn a maximum of 8 credits in all enrollments for this course if different activities or the same activities at higher levels are involved. Students are limited to a combined total of 8 credits in PES 101 through PES 108.

Skill and knowledge development in water-related activities. Separate course sections in activities such as swimming, diving, lifeguarding, water polo, and sailing.

102. Combative Sports

Fall, Spring, Summer. 1(0-2)

R: A student may earn a maximum of 8 credits in all enrollments for this course if different activities or the same activities at higher levels are involved. Students are limited to a combined total of 8 credits in PES 101 through PES 108.

Skill and knowledge development in the art or sport of physical training. Separate course sections in activities such as judo, karate, aikido, and fencing.

103. Conditioning

Fall, Spring, Summer. 1(0-2)

R: A student may earn a maximum of 8 credits in all enrollments for this course if different activities or the same activities at higher levels are involved. Students are limited to a combined total of 8 credits in PES 101 through PES 108.

Knowledge and competency in physical fitness activities that emphasize cardiovascular and muscular training. Separate course sections in activities such as aerobic exercise, power walking, swim conditioning, and weight training.

104. Dance

Fall, Spring, Summer. 1(0-2)

R: A student may earn a maximum of 8 credits in all enrollments for this course if different activities or the same activities at higher levels are involved. Students are limited to a combined total of 8 credits in PES 101 through PES 108.

Skill and knowledge development in dance activities. Separate course sections in dance styles such as ballet, modern, jazz, Latin, and social.

105. Gymnastics

Fall, Spring, Summer. 1(0-2)

R: A student may earn a maximum of 8 credits in all enrollments for this course if different activities or the same activities at higher levels are involved. Students are limited to a combined total of 8 credits in PES 101 through PES 108.

Skill and knowledge development in gymnastics. Separate sections in activities such as apparatus, tumbling, and floor exercise.

106. Individual Sports

Fall, Spring, Summer. 1(0-2)

R: A student may earn a maximum of 8 credits in all enrollments for this course if different activities or the same activities at higher levels are involved. Students are limited to a combined total of 8 credits in PES 101 through PES 108.

Skill and knowledge development in individual sports. Separate course sections in activities such as bowling, golf, skating, self defense, and track and field.

107. Racquet Sports

Fall, Spring, Summer. 1(0-2)

R: A student may earn a maximum of 8 credits in all enrollments for this course if different activities or the same activities at higher levels are involved. Students are limited to a combined total of 8 credits in PES 101 through PES 108.

Skill and knowledge development in racquet sports. Separate course sections in sports such as badminton, racquetball, and tennis.

108. Team Sports

Fall, Spring, Summer. 1(0-2)

R: A student may earn a maximum of 8 credits in all enrollments for this course if different activities or the same activities at higher levels are involved. Students are limited to a combined total of 8 credits in PES 101 through PES 108.

Skill and knowledge development in team sports. Separate course sections in sports such as basketball, ice hockey, lacrosse, soccer, softball, and volleyball.

- 120. Personal Health**
Fall, Spring, Summer. 3(3-0)
Physical, mental, emotional, social, and spiritual domains of health. Alternative health values and behaviors. Developing healthy lifestyles.
- 121. The Healthy Lifestyle**
Fall, Spring, Summer. 3(2-2)
Cardiovascular risk factors, lifestyle habits, and aerobic capacities and their relationship to optimal health and longevity. Individual physical activity required as part of the course.
- 125. First Aid and Personal Safety**
Fall, Spring, Summer. 3(3-0)
Knowledge and application of first aid concepts relating to respiratory and cardiopulmonary disorders, shock, wounds, burns, fractures, drug poisoning, childbirth, litigation. Preventing trauma by recognizing and avoiding safety hazards.
- 170. Foundations of Physical Education and Exercise Science**
Fall, Spring. 2(2-0)
Physical education and exercise science as a disciplinary major. Subdisciplines and professions. Historical perspectives.
- 171. Athletics in Higher Education**
Fall. 1(1-0)
Philosophy and organization of athletics. Athletics and academic achievement. Ethical issues, legal issues, social conduct, eligibility, athlete's rights and responsibilities. Coaches' responsibilities and institutional obligations.
- 201. Water Safety Instruction**
Fall, Spring. 2(1-2)
Knowledge and skills necessary to plan and conduct American Red Cross water safety courses. Current lifesaving certification is assumed.
- 202. Aerobic Exercise Instruction**
Fall, Spring. 3(2-3)
Theory and practice for aerobic exercise leaders. Functional effects of physical activity. Safe exercise techniques. Modifications and precautions for special populations. Choreography practice. Health and exercise screening. Legal issues.
- 203. Self-Defense Instruction**
Spring of even-numbered years. 2(1-2)
Knowledge, skills, strategies, tactics, and experience necessary to teach personal defense skills. Assaultive process and situation assessment. Prevention, de-escalation, confrontation skills, and self defense. Competence in self defense assumed.
- 204. Sailing and Cruising**
Fall, Spring, Summer. 2(1-3)
Knowledge, skills, and experience necessary to sail large vessels on inland and coastal waters. Live aboard and sail for six days and nights, traveling approximately 250 miles. Competence in sailing small crafts assumed.
- 205. Lifeguarding**
Fall, Spring, Summer. 2(1-2)
Lifeguarding knowledge and skills necessary to obtain American Red Cross Lifeguarding certificate. Advanced swimming level is assumed.
- 216. Applied Human Anatomy**
Fall. 3(3-0)
R: Not open to freshmen. Open only to students in Physical Education and Exercise Science.
Structural anatomy of the human body. Interrelationships of structure, function, and human movement.
- 217. Applied Human Anatomy Laboratory**
Spring. 1(0-3)
P: PES 216. R: Not open to freshmen. Open only to students in Physical Education and Exercise Science.
Major bones, muscles, nerves, vessels, and organs of the human body. Articulations, muscle origins, muscle insertions, and prime moving actions.
- 250. Measurement in Physical Education and Exercise Science**
Fall, Spring. 3(3-0)
Methods and materials for measurement and evaluation. Motor skills, physical fitness, knowledge, and attitudes associated with physical activity.
- 260. Physical Growth and Motor Behavior**
Fall, Spring. 3(3-0)
R: Not open to freshmen.
Physical growth and biological maturity as related to motor performance and skill learning. Sequential progressions of fundamental motor skills. Physical fitness of children and youth. Motor abilities. Stages of skill acquisition.
- 300A. Coaching Baseball**
Fall. 2(1-2)
R: Not open to freshmen.
Techniques for coaching baseball. Rules, strategies, and training. Development and evaluation of player skills. Planning, conducting, and evaluating practices.
- 300B. Coaching Sports for Athletes with Disabilities**
Spring of even-numbered years. 2(2-0) Interdepartmental with Park and Recreation Resources.
Rules, strategies, and training. Developing and evaluating player skills. Planning, conducting, and evaluating sport practices. Health and safety concerns.
- 300C. Coaching Soccer**
Spring. 2(1-2)
R: Not open to freshmen.
Techniques for coaching soccer. Developing and evaluating player and team skills. Planning, conducting and evaluating practices and games. Rules, drills, strategies and training.
- 300D. Coaching Basketball**
Fall. 2(2-0)
R: Not open to freshmen.
Techniques and strategies for coaching basketball. Rules, drills, and training. Development and evaluation of individual and team skills. Planning, conducting, and evaluating practices and games.
- 300E. Coaching Football**
Fall. 2(2-0)
R: Not open to freshmen.
Techniques and strategies for coaching football. Rules, drills, and training. Development and evaluation of individual and team skills. Planning, conducting, and evaluating practices and games.
- 300K. Coaching Track and Field**
Fall. 2(1-2)
R: Not open to freshmen.
Techniques and strategies for coaching track and field. Rules, drills, and training. Development and evaluation of participant skills. Planning, conducting, and evaluating practices and meets.
- 301E. Advanced Football Coaching**
Spring. 2(2-0)
P: PES 300E. R: Not open to freshmen
Administrative and planning responsibilities. Advanced techniques in offensive and defensive position play. Scouting and performance evaluation. Weight training and conditioning. Athletic training procedures. Recruitment. Compliance.
- 310. Physiological Bases of Physical Activity**
Fall, Spring. 3(3-0)
P: PSL 250, CEM 141, PES 216, PES 217. R: Open only to Physical Education and Exercise Science majors.
Acute and chronic effects of exercise on various body systems. Principles of training, exercise prescription, and the role of physical activity in health and disease.
- 320. Athletic Training**
Fall, Summer. 3(3-0)
P: PES 125, PES 216, PES 217, PES 310 or concurrently. R: Not open to freshmen.
Athletic injury recognition, prevention, evaluation, management, care, counseling, and rehabilitation. Organization and administration.
- 330. Structural and Mechanical Analysis of Physical Activity**
Fall, Spring. 3(2-2)
P: PES 216, PES 217, PHY 231.
Biomechanical analysis of human movement based upon musculoskeletal structure and function. Mechanical principles.
- 340. Psychological Bases of Physical Activity**
Fall, Spring. 3(3-0)
P: PES 260 or concurrently.
Psychological factors affecting motor skill acquisition and performance. Psychological skills which enhance sport performance. Applications of learning theory.
- 400. Principles of Coaching I**
Fall. 4(4-0)
R: Not open to freshmen or sophomores. Not open to majors in the Department of Physical Education and Exercise Science.
Basic principles of anatomy, biomechanics, and physiology for coaching competitive sports. Applications to athletes of different ages and abilities.
- 401. Principles of Coaching II**
Spring. 4(4-0)
R: Not open to freshmen or sophomores. Not open to majors in the Department of Physical Education and Exercise Science.
Sociological, administrative, philosophical, legal, ethical, and chemical health issues related to coaching competitive sports. Applications to athletes of different ages and abilities.
- 420. School Health Education**
Fall. 3(3-0)
P: PES 120. R: Not open to freshmen and sophomores.
Organization and administration of a comprehensive school health education program. Interaction of school health services, healthful environment, and health instruction in the development of a healthy lifestyle.
- 421. Advanced Athletic Training**
Spring. 3(3-0)
P: PES 320, PES 330 or concurrently. R: Not open to freshmen and sophomores.
Advanced knowledge and skills of athletic health care. Current issues of rehabilitation, organization and administration, therapeutic modalities, and injury evaluation.
- 422. Advanced Rehabilitation of Athletic Injuries**
Spring of odd-numbered years. 3(3-0)
P: PES 421. R: Not open to freshmen and sophomores.
Rehabilitation and therapeutic modalities used to manage athletic injuries. Anatomical and neurophysiological bases of techniques. Indications and contraindications of rehabilitation protocols.
- 445. Sociocultural Analysis of Physical Activity**
Fall, Spring. 3(3-0)
R: Open only to seniors or graduate students.
Sociocultural context of and social practices in sport and physical activity.

Descriptions — Physical Education and Exercise Science of Courses

450. Design and Evaluation of Physical Activity Programs
Fall, Spring. 3(3-0)

R: Open only to seniors and graduate students. Development and evaluation of programs in physical education and exercise science.

451. Physical Education in Preschools and Elementary Schools
Fall. 3(1-5)

P: PES 260 or PES 460. R: Not open to freshmen and sophomores. Not open to students with credit in TE 401. Methods of instruction for teaching physical activities to preschool and elementary school children. Development of teaching sequences. Clinical experience in teaching children and peers.

452. Physical Education in Middle and High Schools
Spring. 3(2-3)

P: PES 106, PES 107, PES 108, PES 340. R: Open only to seniors and graduate students. Not open to students with credit in TE 402. Methods of instruction for teaching physical activities to middle and high school students. Development of teaching sequences. Clinical experience in teaching students and peers.

453. Administration of Intramural Sports Programs
Spring. 2(2-0)

R: Not open to freshmen and sophomores. Organization and administration of intramural programs in educational settings. Philosophy, values, planning, scheduling, competitive units, classification systems, budgeting, facilities, officiating, clubs, issues, and trends.

454. Facility Planning and Construction
Spring. 3(3-0)

R: Not open to freshmen or sophomores. Planning of athletic and physical education facilities such as gymnasias, ice rinks, swimming pools, and outdoor areas. Space utilization standards and guidelines. Selection of materials and equipment.

460. Developmental Bases of Motor Skills
Fall, Spring, Summer. 2(2-0)

R: Open only to majors in the College of Education and College of Human Ecology. Not open to students in Physical Education and Exercise Science. Not open to students with credit in PES 260.

Influence of physical growth and biological maturation on motor skill development. Sequential progressions of fundamental motor skills. Gross motor dysfunction and health-related fitness of children. Techniques of helping children to acquire skills.

461. Developmental Bases of Motor Skills Laboratory
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course.

P: PES 460 or PES 260. R: Students must apply one term in advance of enrollment. Application of concepts related to physical growth and motor development. Practice in planning and teaching fundamental motor skills. Methods of evaluating teaching.

P: PES 460 or PES 260. R: Students must apply one term in advance of enrollment.

465. Physical Activity for Special Populations
Fall, Spring. 3(2-2)

R: Not open to freshmen or sophomores. Methods and materials for teaching physical activity in school and community settings for persons with disabilities and youths at risk.

466. Practicum in Adapted Physical Activity
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course.

R: Approval of department. Supervised teaching of physical activities and/or coaching sports to persons with disabilities and youths at risk.

470. Proseminar in Physical Education and Exercise Science (W)
Fall, Spring. 3(3-0)

R: Open only to seniors and graduate students. Completion of Tier I writing requirement. Philosophical perspectives in physical education, sport, and exercise science.

482. Topics in Physical Education and Exercise Science (MTC)
Fall, Spring, Summer. 2 to 4 credits. A student may earn a maximum of 9 credits in all enrollments for this course.

R: Open only to juniors, seniors, and graduate students in the Department of Physical Education and Exercise Science or approval of department. Selected topics in areas such as physiology of exercise, biomechanics, motor behavior, psychosocial aspects of activity, program design and evaluation, athletic training, and coaching.

490. Independent Study
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course.

R: Approval of department. Supervised individual or group study in various fields of emphasis in physical education and exercise science.

494. Fieldwork
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course.

R: Approval of department. Supervised practice in teaching physical education activities, coaching sports, administering sports programs, or conducting research or service activities in physical education and exercise science.

810. Physiology of Physical Activity
Fall. 3(3-0)

Acute and chronic effects of exercise on the various body systems. Program design. Issues in exercise physiology.

811. Physiological Evaluation and Exercise Prescription
Fall. 2(0-4)

P: PES 810 or concurrently. Techniques in evaluation of physiological capacity and in exercise prescription for various populations.

812. Cardiovascular, Respiratory, and Metabolic Responses to Exercise
Spring of even-numbered years. 3(3-0)

P: PES 810. Acute and chronic effects of exercise on cardiovascular, respiratory, and metabolic system functions. Role of these systems in limiting exercise performance.

813. Neuromuscular and Endocrine Responses to Exercise
Spring of odd-numbered years. 3(3-0)

P: PES 810. Acute and chronic effects of exercise on nervous, muscular, and endocrine system functions. Role of these systems in limiting exercise performance.

830. Biomechanical Analysis of Physical Activity
Fall. 3(2-2) Interdepartmental with Biomechanics.

Kinematic analysis of mechanical and anatomical characteristics in physical activity and sport skills.

831. Advanced Biomechanics of Physical Activity
Spring of even-numbered years. 3(2-2) Interdepartmental with Biomechanics.

P: PES 830. Kinetic analyses of the performance of physical activity and sport.

840. Psychosocial Aspects of Physical Activity
Fall. 3(3-0)

Social psychology of sport and physical activity.

845. Sociocultural Practices in Sport
Spring of odd-numbered years. 3(3-0)

Critical, conflict, and feminist theories on dominant ideologies and social practices in sport.

851. Curriculum and Instruction in Physical Activity Programs
Spring of even-numbered years. 3(3-0)

P: PES 450. Curriculum theory and models in physical education and exercise science. Interaction of curriculum and instructional decision making in physical education and exercise science.

852. Evaluation of Physical Activity Programs
Spring of odd-numbered years. 3(3-0)

P: PES 450. Skills and knowledge necessary to design, implement, analyze, interpret, and report program evaluations in physical education and exercise science.

853. Athletic Administration in Higher Education
Fall. 3(3-0)

Administrative theory, structure, and budget. Facilities, equipment, and marketing. Legal, medical, and safety aspects.

860. Growth and Motor Behavior
Fall. 3(3-0)

Developmental skill sequences and behavior across the lifespan. Correlates of growth, maturation, and motor behavior. Individual and gender differences.

861. Growth, Maturation, and Physical Activity
Spring of even-numbered years. 3(3-0)

P: PES 860. Physical growth, biological maturation, and motor performance. Development of tissues and organs. Development of motor components. Influences of gender and age on growth and performance. Methods of assessment.

862. Motor Skill Learning
Spring of odd-numbered years. 3(3-0)

P: PES 860. Learning and performance theory applied to gross motor skills. Conditions influencing skill acquisition. Emphasis on neuropsychological and human performance models.

865. Curriculum and Instruction in Adapted Physical Education
Fall of even-numbered years. 3(3-0)

Design of curricula and implementation of instruction in physical education for students with disabilities.

866. Research on Sports for Athletes with Disabilities
Fall of odd-numbered years. 3(3-0)
 Performance capabilities of athletics with disabilities. Research on areas such as exercise physiology, sport biomechanics, sport psychology, sport sociology, motor development, and motor learning.

867. Practicum in Adapted Physical Activity
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course.
C: PES 865 or PES 866. R: Approval of department.
 Supervised practice in teaching physical activities and/or coaching sports for persons with disabilities.

870. Physical Activity and Well-Being
Fall. 3(3-0)
 Relationship of physical activity to human well-being. Influence of growth, biological maturity, aging, body composition, nutrition, training, and rest on health and performance.

871. Research Methods in Physical Education and Exercise Science
Spring. 3(3-0)
R: Open only to graduate students in Physical Education and Exercise Science.
 Research and analytical methodology including survey, qualitative, historical, philosophical, descriptive, meta-analytical, creative, and experimental methods.

882. 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.

890. 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.

893. 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.
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.

894. 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: Approval of department.
 Supervised graduate practicum in schools or other settings.

897. 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 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.

899. 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 Biomechanics.
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.

PHYSICS

PHY

**Department of Physics and Astronomy
 College of Natural Science**

170. Investigations in Physics
Fall. 3(0-6)
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 132 or concurrently. R: Not open to students with credit in LBS 164 or PHY 183 or PHY 183B or PHY 193H or PHY 231 or PHY 231B.
 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 193H or PHY 231 or PHY 231B. R: Not open to students with credit in LBS 267 or PHY 184 or PHY 184B or PHY 232 or PHY 232B or PHY 294H.
 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 132 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.

183A. Physics I, CBI
Fall, Spring, Summer. 1 credit.
P: PHY 181B. R: Not open to students with credit in PHY 183 or PHY 183B or PHY 231 or PHY 231B 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.

183B. Physics for Scientists and Engineers I, CBI
Fall, Spring, Summer. 4 credits.
P: MTH 132 or concurrently. R: Not open to students with credit in PHY 231 or PHY 183 or PHY 231B or PHY 193H or PHY 181B or LBS 164.
 Mechanics, Newton's laws, momentum, energy conservation laws, rotational motion, oscillation, gravity, waves. Competency based instruction.

184. Physics for Scientists and Engineers II
Fall, Spring. 4(5-0)
P: PHY 181B or PHY 183 or PHY 183B or PHY 193H or LBS 164; MTH 133 or concurrently. R: Not open to students with credit in LBS 267 or PHY 182B or PHY 184B or PHY 232 or PHY 232B or PHY 294H.
 Electricity and magnetism, electromagnetic waves, light and optics, interference and diffraction.