PHIL 550 (3) Special Topics
Intensive study of a single philosopher or topic.

PHIL 555 (3) Existentialism & Phenomenology
In-depth analysis of major European existentialists such as Kierkegaard, Heidegger, and Sartre.

PHIL 560 (3) Philosophy of the Arts
Aesthetic principles, theories, and the creative process. Theories of visual arts, music, literature, dance, etc.

PHIL 573 (3) Knowledge and Reality
Analysis of the status and justification of claims about the nature and limits of human knowledge and the nature of what may be held to be real.

PHIL 574 (3) Philosophy of the Mind
The nature of consciousness, mind and body relations, and freedom of action.

PHIL 580 (3) Philosophy of Science
Nature of explanations, causality, theoretical entities, and selected problems.

PHIL 590 (1-6) Workshop
Special event of less than semester duration.

PHIL 591 (1-6) In-Service

PHIL 677 (1-6) Individual Study
Individual study of a philosopher or problem.

PHIL 691 (1-6) In-Service
Individual service project

PHYSICAL EDUCATION MA

PHYSICAL EDUCATION MS

(DISCIPLINE-BASED)

College of Allied Health and Nursing
Department of Human Performance
1400 Highland Center • 507-389-6313

Chair: Harry Krampf, Ph.D.
Graduate Coordinator: Joe A. Walsh, Ed.D.

Rayla Allison, JD; Ken Ecker, Ph.D.; Sherry Folsom-Meek, Ph.D.; Kent Kalm, Ed.D.; Lynda Reeves, Ph.D.; Gary Rushing, Ed.D.; Patrick Sexton, Ed.D.; Mary Visser, Ph.D.

The strength of the graduate programs in the Department of Human Performance at Minnesota State University rests in flexibility. There are opportunities for students to pursue either the Master of Arts or the Masters of Science degree in Physical Education. The programs may be structured to the needs of the generalist planning either to enter or return to the public school setting, or for the student who desires specialization. The program affords in-depth study opportunities in the following concentrations: Developmental/Adapted Physical Education, Elementary/Secondary Physical Education, Exercise Science: Cardiac Rehabilitation-Clinical Exercise Physiology, Exercise Science: Exercise Physiology, Psychological Aspects of Sport, and Sport Administration.

Excellent interdisciplinary relationships exist across the University in departments offering graduate studies. Students are encouraged, where appropriate, to avail themselves of the various dimensions of expertise. The graduate program also offers a complement of summer classes, facilitating continuity in graduate pursuits.

Admission. The requirements of the College of Graduate Studies and Research must be completed for admission to program.

Graduate Assistantships and Financial Aid. The Department of Human Performance, in cooperation with athletics, campus recreation programs and a contractual agreement with Gustavus Adolphus College and Orthopaedic and Fracture Clinic, employs approximately 30 graduate assistants at stipends up to $8,000 for the academic year. All graduate assistants must be full-time graduate students. Graduate assistants receive a tuition stipend and qualify for in-state tuition rates. Applications for graduate assistantships are accepted until positions are filled, but candidates are encouraged to apply by February 15 for the following fall semester. Graduate assistantship applications can be secured directly from the College of Graduate Studies and Research, or its Web site.

PHYSICAL EDUCATION MA

General Requirements - All Options:
Language Competency. A reading knowledge of one modern foreign language or research substitution is required in the MA programs. The student should consult with the graduate coordinator to determine specific requirements.

At least 20 credits must be in the Department of Human Performance, and at least 50% of the coursework must be taken at the 600 level (excluding thesis and APP credits).

Thesis Plan: Written and oral comprehensive exams and a thesis for credit are required.

Alternate Plan Paper: A capstone paper approved by the advisor is required and may be developed in connection with a graduate course in the Human Performance Department. A written comprehensive exam is required, and at discretion of student's advisor, an oral exam germane to the APP will be required.

Concentrated Options of Study
Students should be aware that changes may occur in a concentration core during their time on campus, since curriculum is always an on-going process. Therefore, the student should always be in consultation with the advisor in the event that the faculty submits new proposals that may reflect such changes. In such an event, students will always be afforded their rights to take advantage of such changes that will best serve them during their program of study. Choose an area of concentration from those listed below.

SPORT ADMINISTRATION*
(Thesis Plan - 30-32 credits)
(Alternate Plan Paper - 34-36 credits)

This program is designed to prepare the student for a career in some capacity of sports management at either a public school, college or professional/private sector of sport.

Required Sport Administration Core (18 credits)
HP 565 Legal Aspects of Sport (3)
HP 610 Statistical Methods (3)
HP 630 Techniques of Research (3)
HP 650 Principles of Sport Management (3)
HP 651 Sport Management Seminar (3)
HP 698 Intern: Sport Administration (3-10)

Required Thesis or Alternate Plan Paper
HP 699 Thesis (3-4 credits)
HP 694 Alternate Plan Paper (1-2 credits)

Required Electives (8-17 credits)
The student must choose the remaining electives in consultation with an advisor. HP 568, Sport Promotion and Marketing; 640, Planning Sports Facilities; 641, Psychology of Sport and Exercise; and HP 660, Financial Aspects of Sport, are strongly recommended.

*The Department is in the process of submitting a name change to Sport Management through proper curriculum channels.

ELEMENTARY/SECONDARY PHYSICAL EDUCATION
(Thesis Plan - 30-32 credits)
(Alternate Plan Paper - 34-36 credits)

The program is designed to refine teaching skills for the elementary, middle school, and high school physical educator,

Required Core (17 credits)
HP 513 Lifespan Motor Development (2)
HP 610 Statistical Methods (3)
HP 623 Current Trends (3)
HP 630 Techniques of Research (3)
HP 675 Motor Learning (3)
HP 698 Internship (3)

Required Thesis or Alternate Plan Paper
HP 694 Alternate Plan Paper (1-2 credits)
HP 699 Thesis (3-4 credits)

Required Electives (10-18 credits)
Choose any electives in consultation with an advisor. A graduate student's plan of study for the Master of Arts degree must include at least 10 credits of outside electives.

CARDIAC REHABILITATION/CLINICAL EXERCISE PHYSIOLOGY (CR/CEP)
(36-37 credits)

A 37-41 credit program leading to a Master of Arts degree, Cardiac Rehabilitation/Clinical Exercise Physiology provides the necessary laboratory, research and clinical experiences for employment in cardiopulmonary rehabilitation, adult fitness and corporate programs. Each year's class receives practical, hands-on experience in cooperation with area/regional hospitals in Mankato, Minneapolis/St. Paul, and Rochester, MN. The Cardiac Rehabilitation Program provides Phase 3 and 4 cardiac rehabilitation programming in health and exercise to patients each week. The required internship, during the middle and/or last semester of graduate work, provides additional opportunities in the student's area of study.

Required Core (minimum 15-16 credits)
HP 601 Advanced Physiology of Exercise (3)
HP 605 Nutrition in Human Performance (3)
HP 610 Statistical Methods (3)
HP 630 Tech. of Research (3)
HP 693 Seminar in Exercise Science (1)
HP 694 Alternate Plan Paper (2 credits) **OR**
HP 699 Thesis (3)

Required Concentration/Specialization (16-20 credits)
BIO 533 Cardiovascular Physiology (3)
BIO 566 Pharmacology (3)
HP 583 Cardiac Rehabilitation (3)
HP 645 Physical Activity/Fitness an Chronic Disease (3)
HP 655 ECG Interpretation (3)
HP 698 Internship: Cardiac Rehabilitation (1-5)

Required Electives (5 credits)
choose any 5/600 level elective courses in consultation with an advisor

EXERCISE SCIENCE/EXERCISE PHYSIOLOGY
(36 credits)

This program is designed to provide comprehensive, laboratory-based study of the effects of physical activity on human structure and function across the life span. Degree requirements are structured so that the student may pursue study in an area of individual focus.

Required Core (20-21 credits)
HP 601 Advanced Physiology of Exercise (3)
HP 602 Laboratory Techniques (2)
HP 605 Nutrition in Human Performance (3)
HP 610 Statistical Methods (3)
HP 630 Techniques of Research (3)
HP 693 Seminar in Exercise Science (1)
HP 694 Alternate Plan Paper (2) **OR**
HP 699 Thesis (3)
CHEM 560 Biochemistry (3)

Required Electives (15-16 credits)
Choose three from the following (other courses may be selected with consent of an advisor)

HP 567 Wellness Program Development and Administration (3)
HP 645 Physical Activity and Chronic Disease (3)
HP 655 ECG Interpretation (3)
HP 698 Internship: Exercise Physiology Lab (1-3)
BIO 517 Biology of Aging and Chronic Disease (3)
CHEM 561 Biochemistry II (3)
PSYCH 551 Methods of Enhancing Performance (3)

Choose one of the following:
BIO 533 Cardiovascular Physiology (3)
BIO 538 Endocrinology (3)
BIO 566 Pharmacology (3)

*Chem 360 and/or 450 or equivalent transfer credit may be substituted for 560, resulting in 3 or more credits of additional graduate work by the student.

**Please note: Possible curriculum revision deliberations were being considered in the Exercise Physiology tract by the Human Performance faculty when the new graduate bulletin was going to press. Therefore, students should consult with the graduate coordinator and their advisor in the event of any possible changes that may have been approved through the proper university graduate faculty curriculum process.

DEVELOPMENTAL/ADAPTED PHYSICAL EDUCATION (MA/MS)
(Thesis Plan - 30-31)
(Alternate Plan Paper - 34-36)

Maximum of 15 hours of D/APE licensure courses can count toward MA/MS degree because over 50% of coursework must be 600-level. *If student already has D/APE licensure, D/APE coursework will consist of 600-level courses in D/APE, Special Education, and from other departments.

Required Core in D/APE (minimum 18-19 credits)
HP 511 Development Adapted Physical Education (3)
HP 512 Assessment in Adapted Physical Education (2)
HP 513 Lifespan Motor Development (2)
HP 521 Teaching Sport to Individuals with Disabilities (2)
HP 522 Teaching Adapted Aquatics (2)
HP 545 PE for Students with Mental and Emotional Disabilities (3)
HP 571 Consulting Techniques in D/APE (3)
HP 698 Internship in DAPE (1-2)

Required (6 credits)
HP 610 Statistical Methods in Physical Education (3)
HP 630 Techniques of Research (3)

Required Thesis or Alternate Plan Paper
HP 694 Alternate Plan Paper (1-2)
HP 699 Thesis (3-4)

Required Special Education Electives (3 credits)
ESSP 605 Introduction to the Psychology and Education of Exceptional Children and Youth (3)

Required Human Performance Electives (9-12 credits)
Student should consult with major advisor. **See above note.
HP 604 Pediatric Motor Delays: Principles (2)
HP 614 Pediatric Motor Delays: Best Practices (2)
HP 624 Creative Arts Therapies for Individuals with Special Needs (3)
HP 634 Consultation and Staff Development in Developmental/Adapted Physical Education (3)
HP 654 Current Issues in Developmental/Adapted Physical Education (3)
HP 664 Administration in Developmental/Adapted Physical Education (3)
HP 674 Transition in Developmental/Adapted Physical Education (3)

PSYCHOLOGICAL ASPECTS OF SPORT
(Thesis Plan - 30-32)
(Alternate Plan Paper - 34-36)

The program is designed to develop a theoretical base in the discipline of sport psychology, and better prepare students and coaches to apply such knowledge to performance enhancement issues associated with competitive athletics and exercise settings.

Required Human Performance Core (15 credits)
HP 610 Statistical Methods (3)
HP 630 Techniques of Research (3)
HP 641 Psychology of Sport (3)
HP 675 Motor Learning (3)
HP 698 Intern: Sport Psychology (3)

Required Thesis or Alternate Plan Paper
HP 694 Alternate Plan Paper (1-2)
HP 699 Thesis (3-4)

Required Psychology Core (9-10 credits)*
PSY 537 Youth and Sport (3)
PSY 551 Enhancing Performance (3)
One other course in Psychology (3-4) in consultation with major advisor.

Required Electives (3-11 credits)
Choose electives in consultation with major advisor. EDLD 644, Ethics and Leadership and HP 677, IS: Sports in American Culture, are strongly recommended.

*Please note: As a result of changes in the Department of Psychology, it is possible that one of the required psychology courses may not continue to be offered. In the event that this happens, students should consult with their advisor for other possible substitution options as it pertains to the psychology requirements.

PHYSICAL EDUCATION MS
(DISCIPLINE-BASED)

(Thesis Plan - 30)
(Alternate Plan Paper - 34-36)

Teaching licensure is a prerequisite to pursuing this degree, and is for teachers interested in enrichment in a teaching area. This degree does not lead to initial teaching licensure. Students who desire initial licensure should consult the Master of Arts in Teaching (MAT) program. Please see the section concerning the MAT program that is listed in this bulletin.

General Requirements - All Options:
At least 50% of the coursework must be taken at the 600 level (excluding thesis and APP credits).

Thesis Plan: At least 18 credits must be in the Department of Human Performance. A research paper is included.

Alternate Plan Paper: At least 20 credits must be in the Department of Human Performance. A capstone paper is required, with topic to be approved by major advisor. Topic may be related to course with student's program of study. However, the Alternate Plan Paper requires scholarly inquiry clearly beyond content of any course in student's program of study. A written comprehensive exam is required, and at the discretion of a student's advisor, and oral exam germane to the Alternate Plan Paper will be required.

Required Option:
Choose an area of concentration from the options listed below.

ELEMENTARY/SECONDARY PHYSICAL EDUCATION
(Thesis Plan - 30 credits)
(Alternate Plan Paper - 34 credits)

Required Core (17 credits)
HP 513 Lifespan Motor Development (2)
HP 610 Statistical Methods (3)
HP 623 Current Trends (3)
HP 630 Techniques of Research (3)
HP 675 Motor Learning (3)
HP 698 Internship (3)

Required Thesis or Alternate Plan Paper
HP 699 Thesis (3-4)
HP 694 Alternate Plan Paper (1-2)

Required Electives (3-10 credits)
Choose electives from HP, Psych., Educ., Spec.Ed., RPLS and C&I at 600 level with consent of advisor

Required Professional Education
Electives (6 credits)
Choose 6 credits from electives in Prof. Education in consultation with an advisor

SPORT ADMINISTRATION*
(Thesis Plan - 30-32)
(Alternate Plan Paper - 34)

This program is designed to prepare the student for a career in some capacity of sports management at either a public school, college or professional/private sector of sport.

Required Sport Administration Core (18 credits)
HP 565 Legal Aspects of Sports (3)
HP 610 Statistical Methods (3)
HP 630 Techniques of Research (3)
HP 650 Principles of Sport Management (3)
HP 651 Sport Management Seminar (3)
HP 698 Intern: Sport Administration (3-10)

Required Thesis or Alternate Plan Paper
HP 699 Thesis (3-4)
HP 694 Alternate Plan Paper (1-2)

Required Education Core (4 credits)
Four credits from the College of Education.

Required Electives (2-12 credits)
The student must choose the remaining electives in consultation with an advisor. HP 568, Sport Promotion and Marketing; HP 640, Planning Sport Facilities; HP 641, Psychology of Sport and Exercise; and HP 660, Financial Aspects of Sport are strongly recommended.

*The Department is in the process of submitting a name change to Sport Management through proper curriculum channels.

COURSE DESCRIPTIONS

HP 511 (3) Developmental/Adapted Physical Education
Legal and theoretical bases for teaching physical education to students with disabilities. First course in D/APE sequence.

HP 512 (2) Assessment in Adapted Physical Education
Evaluation of motor skills and fitness among students with disabilities.

HP 513 (2) Lifespan Motor Development
Study of early childhood motor development from infancy through preschool age, including information on delayed development.

HP 514 (3) Physiology of Exercise
Introductory study of the effects of both acute and chronic exercise on structure and function of the human body across the life span.
Prerequisite: Biol. 220, 230, HP 175

HP 519 (2) Teaching Dance to Individuals with Exceptional Needs
Adaptation of dance materials to facilitate learning of individuals with special needs through simulated and hands-on teaching experiences.
Prerequisite: HP 109

HP 521 (2) Teaching Sport to Individuals with Disabilities
Contemporary sport opportunities for individuals with disabilities, with application to teaching and transition planning.
Prerequisite: 4/511 or instructor permission

HP 522 (2) Teaching Adapted Aquatics
Theory and practical experience in teaching swimming and other aquatic skills to individuals with disabilities.

HP 539 (3) Nutrition for Physical Activity and Sport
This course provides in-depth exploration of the dietary needs of physically active individuals across the lifespan. Its laboratory component will focus on performance and interpretation of assessments commonly used to determine dietary and physiological status.

HP 545 (3) Physical Education for Students with Mental and Emotional Disabilities
Theory, strategies, and best practices for teaching physical education to students with mental retardation, emotional/behavioral disorders, autism, attention deficit disorder, and multiple disabilities accompanying mental retardation.

HP 565 (3) Legal Aspects of Physical Education and Sport
To provide legal and safety aspects in physical activity. Legal liability, civil rights, and contract law are emphasized.

HP 566 (3) Graded Exercise Testing and Exercise Prescription
An introduction to basic graded exercise tests and exercise prescription commonly used in clinical as well as health/wellness appraisal settings.
Prerequisite: HP 175, HP 414

HP 567 (2) Wellness Program Development and Administration
Designed to review the various physiological, psychological, and administrative components involved in a comprehensive health/fitness program.
Prerequisite: HP 414 and 466 or equivalent

HP 568 (3) Sport Promotion and Marketing
The application of principles of promotion and marketing to the sport and physical activity industry, including the areas of professional sports, corporate fitness, college/high school athletics, clubs and resorts, and more. Primary focus will be on the application of marketing principles to specific sport scenarios.

HP 570 (3) Psychology of Coaching
To introduce interested students, professionals, and coaching licensure candidates to the psychological literature and latest techniques associated with coaching in an athletic setting.
Prerequisite: Psych. 101 or equivalent

HP 571 (3) Consulting Techniques in D/APE
Study of techniques of consulting in D/APE with the spectrum of individuals involved in the IEP process, including but not limited to: students with disabilities, general physical education teachers, other school professionals and support service personnel, families/parents, peer tutors, and community agencies, to enhance the learning of students with disabilities both within and outside the classroom setting.

HP 582 (1) Coaching Practicum
Supervised experience in a public school varsity/junior varsity sport setting.
Prerequisite: first aid and coaching theory and athletic training

HP 583 (3) Cardiac Rehabilitation
A course designed to provide experience for persons seeking leadership roles in institutions housing programs of rehabilitative cardiovascular exercise and risk factor intervention.
Prerequisite: HP 4/514 and 4/567 or equivalent

HP 590 (1-4) Workshop
Content is variable and based on special topic.

HP 601 (3) Advanced Physiology of Exercise
Integration of the advanced concepts and relevant scientific information surrounding human performance physiology.
Prerequisite: HP 514

HP 602 (2) Laboratory Techniques in Exercise Physiology
Laboratory experiences for advanced exercise physiology students, including various fitness and clinical tests, lactate analysis, spirometry, and measurement of expired gases.
Prerequisite: HP 4/514 or equivalent; HP 601

HP 604 (2) Pediatric Motor Delays: Principles
Focuses on legal bases, theoretical concepts, and current literature addressing pediatric motor delays. Consideration is given to infants, toddlers, and preschoolers with the generic label "developmentally delayed," and those having multiple disabilities, physical disabilities, and sensory/other health impairments.
Prerequisite: 4/513 or equivalent; concurrent with 614

HP 605 (3) Nutrition in Human Performance
An in-depth study of the nutritional needs of athletes and other active individuals, including discussion of current research in the area.
Prerequisite: HP 601

HP 610 (3) Statistical Methods
Introduction to the concepts of descriptive and inferential statistics, applied and theoretical research, and validity and reliability methods used in the disciplines of physical education, human performance, and exercise science.
Prerequisite: at least an undergrad Measurement and Evaluation course

HP 614 (2) Pediatric Motor Delays: Best Practices
Focuses on various aspects of pediatric adapted physical education service delivery. Consideration is given to infants, toddlers, and preschoolers with the generic label "developmentally delayed," and those having multiple disabilities, physical disabilities, and sensory/other health impairments.
Prerequisite: HP 4/513 or equivalent; concurrent with 614

HP 623 (3) Current Trends in Physical Education
Discussion and research relating to current emphases in early childhood/elementary/secondary school physical education.

HP 624 (3) Art and the Creative Process for Individuals with Special
Survey of dance, art, drama, and music therapies in relation to movement-centered activities. Application to specific populations will include discussion and experiential components.

HP 630 (3) Techniques of Research
Introductory course to the research processes involved in the fields of physical education, exercise science, and human performance. Coverage of various types of research designs and writing of the research paper is a major intent of this course.
Prerequisite: required part of core for all master students in Dept. of Human Performance-must be a graduate student

HP 631 (1) Seminar in Exercise Physiology

HP 634 (3) Consultation and Staff Development in
Study of consulting models. Role of developmental/adapted physical education in team approach, including interpersonal communication skills integral to the role of the developmental/adapted physical educator.

HP 635 (3) Gerontologic/Pediatric Exercise Physiology
Acute and chronic changes in physiological functioning children and older adults.

HP 637 (3) Sport Media, Sponsorship and Sales
An in-depth study of sport management theories, policies, objectives, and strategies applied to sport marketing through the functions and areas of sport sponsorships, sales and broadcast, and print media.

HP 638 (3) Managing Sporting Events
Advanced study of managing sporting events covering the policies, strategies and tactics used including planning, budgeting, organization, human resources, risk management, and operations of conducting a successful sporting event.

HP 640 (3) Planning Sport Facilities
Provide the student with information on the planning, development, and administration of sport facilities (i.e., physical education, athletics, recreation, fitness/wellness centers, etc.). The course will also address basics of sport equipment management.

HP 641 (3) Psychology of Sport and Exercise
Psychological parameters that affect performance in athletic and exercise settings. Emphasis on theoretical and scholarly literature associated with exercise and sport psychology. Practical application of psychological principles in sport and exercise dimensions will also be addressed.
Prerequisite: UG degree and basic Psych. (101)

HP 642 (2) Issues in Sports Medicine
A seminar/discussion format course dealing with current issues within the multidisciplinary profession of sports medicine. A course directed toward disciplines dealing with all dimensions of the physically active individual.

HP 645 (3) Physical Activity and Chronic Disease
Identification and assessment of physical activity and fitness in health, lifespan, and various chronic diseases.
Prerequisite: HP 601

HP 650 (3) Principles of Sport Management
This course will emphasize the management functions of planning, organizing, implementing, and controlling. Decision-making, problem-solving, communication, ethics, sport law, and leadership. Personnel management issues will also be addressed.

HP 651 (3) Sport Management Seminar
Examines a variety of topics related to the management of sport organizations. Topics include internship/career opportunities, social-cultural issues, ethical issues, mass communication, sport governance, economic issues, fund-raising, event/facility management, licensing, copyright issues, and labor relations.

HP 654 (3) Current Issues in Developmental/Adapted Physical
Current issues impacting developmental/adapted physical education; with emphasis on examining, comparing, contrasting, and identifying solutions to problems and issues with reference to state and federal physical education/motor development services.

HP 655 (3) Electrocardiographic Interpretation
Methods used in learning to interpret electrocardiograms plus a solid foundation of its application and history.
Prerequisite: HP 601

HP 660 (3) Financial Aspects of Sport
Examines basic financial and managerial accounting concepts necessary to be financially literate in the business of sport. Budgeting and fundraising concepts will also be addressed. Analysis into the understanding of corporate financial workings in the sport industry will equip the student with essential management tools.

HP 661 (3) Administration and Management of Intramural-Recreational Sports
Philosophical base with emphasis on the principles, policies, and procedures for administration of intramural and recreational sports programs.

HP 664 (3) Administration in Developmental/Adapted Physical
Range of responsibilities and obligations integral to administering developmental/adapted physical education programs in compliance with federal and Minnesota mandates.

HP 674 (3) Transition in Developmental/Adapted Physical
Enhances development of transition-related competence of physical education teachers and related-service professionals. Legislative and research knowledge bases, extensions of existing curricula, and community-based resources are used.

HP 675 (3) Motor Learning
Acquaints the student with the terminology, theory, and principles of skill acquisition in the sport and physical activity setting…as well as factors influencing that acquisition. Critical Analysis of research literature will also be part of this course.
Prerequisite: Psych. 101

HP 677 (1-4) Individual Study
Opportunity for in-depth studies when specific human performance course is not available to accommodate the student. Consultation with the faculty member is an important part of developing such topics that meet the individual study arrangement.
Prerequisite: grad. student/professor consent

HP 680 (1-2) Systematic Readings in Physical Education and Human
An arranged readings course of selected professional literature relating to physical education, human performance, exercise science, and sport studies. The student in consultation with a professor determines the specific body of scholarly literature that will be emphasized during the course.
Prerequisite: grad. student/professor consent

HP 691 (1-4) In-Service
Broad spectrum of foci available. Designed in consultation with requesting group.
Prerequisite: grad. student/professor consent

HP 692 (1-10) Internship: Corporate and Community Fitness
Designed to provide the student with hands-on experience in the area of corporate and community fitness.
Prerequisite: completion of graduate core courses: Chem. 560, HP 601, 602, 610, 630, except for seminar or thesis

HP 693 (1) Seminar in Exercise Science
Studies the current problems and trends in selected fields of exercise science as well as current research being performed by department faculty, staff, and students.
Prerequisite: graduate standing

HP 694 (1-2) Alternate Plan Paper
Course requires completion of alternate plan paper.
Prerequisite: grad. student/professor consent

HP 698 (1-10) Internship
Supervised field experience related to the student's academic specialization associated with the disciplines of human performance. Disciplines include the following: College Teaching, Sport Management, Public School Teaching, D/APE, Intramural-Recreational Sports Management, Elementary Physical Education, Exercise Physiology, and Sport Psychology.
Prerequisite: grad. student/professor consent

HP 699 (1-4) Thesis
Course requires completion of thesis paper. Prerequisite: grad. student/professor consent

PHYSICS MS

PHYSICS EDUCATION MS

(DISCIPLINE-BASED)

College of Science, Engineering, & Technology
Department of Physics & Astronomy
141 Trafton Science Center N • 507-389-5743

Chair: Mark Pickar, Ph.D.
Graduate Coordinator: Youwen Xu, Ph.D.

Paul Eskridge, Ph.D.; Robert Herickhoff, Ph.D.; Steven Kipp, Ph.D.; Igor Kogoutiouk, Ph.D.; Mark Pickar, Ph.D.; James Pierce, Ph.D.; Louis Schwartzkopf, Ph.D.; Hai-sheng Wu, Ph.D.; Youwen Xu, Ph.D.

The Department of Physics and Astronomy presents several opportunities for study at the graduate level. The Master of Science is offered as the professional degree in physics. This degree is designed for students wishing to prepare themselves for doctoral study, or for work in a research/industrial position. A student may choose to emphasize the instrumentation area by including appropriate Electrical Engineering, Electronic Engineering Technology, or Computer Science courses. Students interested in teaching at a community college may elect the MS Community College track. Teacher certification is not required for this track.

The Master of Science in Physics Education is designed for individuals interested in strengthening their background in secondary school teaching. Previous teacher licensure is usually required.

Admission. Interested students should complete the general admission requirements of the College of Graduate Studies and Research.

Degree Completion. A graduate student in physics should complete a Plan of Study during the first part of the second semester, prior to the completion of the first 11 graduate credits of the program at Minnesota State University. This will require close consultation between the student and the initial advisor. The comprehensive written exam must be taken by the end of the second semester. A student cannot start his or her thesis research before passing the comprehensive written exam. Please contact the Department of Physics and Astronomy graduate coordinator for additional information.

Financial Assistance. The Department of Physics and Astronomy has a limited number of graduate assistantships available. Information and application materials can be obtained from the department graduate coordinator. Consult the front of this bulletin for more information on financial aid and graduate assistantships.

PHYSICS MS

(Thesis Plan Only - 30 credits)

Required Core (12-15 credits)
PHYS 607 Intro. to Research (2)
PHYS 641 Math Physics I (4)
PHYS 642 Math Physics II (4)
PHYS 699 Thesis (1-6), minimum 3 credits

Required Physics Electives (8-11 credits)
Choose any 500/600 level Physics elective courses approved by the student's advisor.

Required General Electives (7 credits)
Choose any 500/600 level elective courses approved by the student's advisor.

Additional Requirements:
A reading knowledge of a foreign language or a demonstrated ability in computer programming is required. Fifty percent of all courses must be taken at the 600 level. A written exam and a thesis and its oral defense are required.

COMMUNITY COLLEGE TRACK
(Thesis Plan - 30 credits)
(Alternate Plan Paper - 34 credits)

Required Physics Electives Core (9-17 credits)
PHYS 697 Internship (4-8)
In addition, choose any 500/600 level Physics elective courses approved by the student's advisor. Students who would like to have "internship" listed as "Internship in College Teaching" should contact the Graduate Dean.

Required Education Electives (minimum 6 credits)
KSP 625 Philosophy of Education in Historical Context (3)
KSP 670 Collegiate Institutions in the United States (3)
KSP 671 Learning and Teaching in Higher Education (3)

Required General Electives (6 credits)
Choose any 500/600 level elective courses from outside of physics and outside of professional education, approved by the student's advisor.

Required Research Methods (3 credits)
Choose a research methods course approved by the student's advisor.

Required Thesis or Alternate Plan Paper
PHYS 694 Alternate Plan Paper (1-2)
PHYS 699 Thesis (1-6) minimum 3 credits

Additional Requirements:
A reading knowledge of a foreign language or a demonstrated ability in computer programming is required. Fifty percent of all courses must be taken at the 600 level excluding the thesis or APP credits. A written exam is required. A thesis and its oral defense is required, if the thesis option is chosen.

PHYSICS EDUCATION MS

(DISCIPLINE-BASED)
(Thesis Plan - 30 credits)
(Alternate Plan Paper - 34 credits)

Teaching licensure is usually a prerequisite to pursuing this degree, since this degree does not lead to initial teaching licensure. Students who desire initial licensure should consult the Master of Arts in Teaching (MAT) program.

Required Physics Electives (9-17 credits)
Choose any 500/600 level elective courses approved by the student's advisor.

Required Education Electives (6 credits)
Choose any 500/600 level Education elective courses approved by the student's advisor from the following:
KSP 507, 605, 609, 612, 621, 625, 632, 640, 645, 654, 665, 666, 677, 681
EEC 520, 522, 602, 617, 631, 676
CSP 570
EDAD 652, 665

Required General Electives (6 credits)
Choose any 500/600 level elective courses approved by the student's advisor.

Required Research Methods (3 credits)
Choose a research methods course approved by the student's advisor.

Required Thesis or Alternate Plan Paper
PHYS 694 Alternate Plan Paper (1-2)
PHYS 699 Thesis (1-6) minimum 3 credits

Additional Requirements:

Fifty percent of all courses must be taken at the 600 level excluding the thesis or APP credits. A written exam is required. A thesis and its oral defense is required, if the thesis option is chosen.

COURSE DESCRIPTIONS

PHYSICS

PHYS 504 (2) Physics & Society
Relations between physics and other intellectual communities: e.g., philosophy, humanities, social sciences, the arts.
V Prerequisite: con

PHYS 517 (2) Biophysics
Thermodynamic relationships; energy flow in living systems; metabolic heat generation and loss; homeostasis; atomic and molecular bonds in nucleic acids, proteins, and carbohydrates; hormonal regulation; cell metabolism; negative feedback control in living systems; cancer therapy; imaging; disease states; new theories and paradigms.
V Prerequisite: PHYS 212 or 222 and MATH 122

PHYS 535 (3) Modern Physics I
Special Theory of Relativity. Quantum nature of waves and particles: photons, de