## West Point Calendar

## 1995

21 August, Monday First Term Begins 4 September, Monday Labor Day (Classes Suspended) 9 October, Monday Columbus Day (Classes Suspended) 10 November, Friday Veterans Day (Observed) (Classes Suspended) 3-26 November Thanksgiving Holiday Thursday-Sunday (Classes Suspended) 2 December, Saturday Army-Navy Football Game (All Cadets Attend) 4 December, Thursday Final Class Day, First Term 15 December, Friday Term-End **Examinations Begin** 21 December, Thursday First Term Ends December Graduation hristmas Leave begins upon completion of last vamination or military duty.

## 1996

7	January, Sunday	Christmas Leave Ends			
8-22	January Monday-Monday	Military Program Intercession			
15	January, Monday (Classes Suspended)	Dr. King's Birthday			
23	January, Tuesday	Second Term Begins			
7-19	February Saturday-Monday	President's Weekend (Classes Suspended)			
16	March, Saturday	Spring Leave Begins			
24	March, Sunday (7:00 p.m.)	Spring Leave Ends			
18	May, Saturday Second Term	Final Class Day,			
20	May, Monday Examinations Begin	Term-End			
25	May, Saturday	Second Term Ends			
28	May, Tuesday	Graduation Week Begins			
1	June, Saturday	Graduation Day, Class of 1996			
	14.16.44				

Beginning of approximately two weeks of leave for new Third Class prior to reporting to Camp Buckner for summer training

1 July, Monday Reporting Day Class of 2000

This Calendar should not be considered a contract between the U.S. Military Academy and any prospective candidate. These dates are subject to change to meet varying requirements of the U.S. Army.

1995-96

According to Joe Myers, the credit hours in 1985, 1995 and 2005 can be converted to in-class hours by the following remarks:

3CH means 40 in-class hours over the semester (as per your email) 3.5 CH means 48 in-class hours over the semester

- 4 64 in class hours (56 are with out of class prep and 8 are "labs" with no prep -- see next line)
- 4.5 64 in class hours, same as above -- This is probably the nuance I spoke of below -

"Our first semester core math course has the same number of attendances and prep as the following two semesters, but carries 1/2 less CH just for nice rounding purposes -- the CH for the 3 semester sequence is accurate and that's good enough."

9 Is this really a 1-semester course? I bet it is the 2-semester sequence MA104/205, and so would mean 64 in-class hours for each of two semesters, 4.5CH each semester.

Using 1985 Nos:

13.5 in class has per (# in Core (see p 37 bottom)

13.3 " elective courses (40 hrs for 3 cr course)

Phys Ed.

Have credits, can convert to hours

ics, chemistry, history, social sciences, and foreign languages. Validation of a core course allows a cadet to substitute an additional elective in place of the validated course. If a cadet shows unusual ability or has prior knowledge of a subject but cannot validate it, he or she may be enrolled in an advanced or accelerated program.

Honors Courses and Individual Advanced Study If a cadet is an exceptional student, he or she may enroll in an honors course or advanced individual study in any of the disciplines taught at the Military Academy. These programs emphasize independent or tutorial work and are excellent preparation for graduate study.

#### Individual Advanced Development

During the summer preceding both the junior and senior years, cadets select an academic, military, or physical development program to enrich their individual development. Cadets may choose from over 150 academic enrichment

opportunities which normally involve about three weeks of active summer participation in educational experiences and which include, but are not limited to the following: Operation Crossroads Africa, research work in technical laboratories throughout the United States, immersion language training in foreign countries, medical internships at Walter Re-Medical Center, study at other civilian and military institutions, and numerous workfellow positions with federal and Departmen of Defense agencies.

USMA Baseline Academic Program 40 courses.

Freshman Year	1	ENGLISH	HISTORY (US or WORLD)	COMPUTER SCIENCE	CHEMISTRY	MATH
	2	LITERATURE	HISTORY (US or WORLD)	PSYCHOLOGY	CHEMISTRY	MATH
Sophmore Year	7	FOREIGN LANGUAGE	AMERICAN POLITICS	PHILOSOPHY	PHYSICS	MATH
	2	FOREIGN LANGUAGE	ECONOMICS	TERRAIN ANALYSIS	PHYSICS	MATH
Junior Year	1	INTERNATIONAL RELATIONS	ELECTIVE (1)	ENGINEERING* SCIENCE	ENGINEERING* SCIENCE	MILITARY
	2	ENGLISH	ELECTIVE (2)	MILITARY LEADERSHIP	ENGINEERING* SCIENCE	MILITARY HISTORY
Senior Year	,	CONSTITUTIONAL LAW	ELECTIVE (3)	ELECTIVE (4)	ENGINEERING* DESIGN	ELECTIVE (5)
die des de la composition de l	2	ELECTIVE (6)	ELECTIVE (7)	ELECTIVE (8)	ENGINEERING* DESIGN	ELECTIVE (9)

<sup>\*</sup> Offered in 7 different versions: CIVIL, COMPUTER, ELECTRICAL, ENVIRONMENTAL, MECHANICAL, NUCLEAR, SYSTEMS.

West Point 1995-96

# The Academic

You either pick a Freld of Study or Rich a

OF STUDY



OPTIONAL MAJOR

9 Courses/27 Credits

10-13 Courses/30-38 Credits

PRILITARY SCHENCE

**4 Intensive Sessions** 

PHYSICAL EDUCATION

### ACADEMIC PROGRAM: BREADTH OF STUDY

31 Courses

\* Additional Credits for ABET Course

#### FIELDS OF STUDY/MAJORS (All majors are capitalized)

Applied Sciences & Engineering Basic Sciences Interdisciplinary CHEMISTRY AND LIFE SCIENCE

- \* CIVIL ENGINEERING COMPUTER SCIENCE
- \* ELECTRICAL ENGINEERING
- \* ENGINEERING MANAGEMENT ENGINEERING PHYSICS ENVIRONMENTAL ENGINEERING **Environmental Science** MATHEMATICAL SCIENCE
- \* MECHANICAL ENGINEERING Nuclear Engineering OPERATIONS RESEARCH

San 17 serel courses

**Physics** SYSTEMS ENGINEERING American Legal System BEHAVIORAL SCIENCES **ECONOMICS** 

Foreign Area Studies (1)

FOREIGN LANGUAGES (2) (One or two; choice of seven)

GENERAL MANAGEMENT

GEOGRAPHY (3)

HISTORY

(Military, Modern History Field of Study)

Military Art and Science

POLITICAL SCIENCE

STUDIES IN PHILOSOPHY AND LITERATURE

- NOTE (1) Choose from: East Asia, Latin America, Eastern Europe, Western Europe, or the Middle East.
- NOTE (2) Foreign Languages available: Arabic, Chinese, French, German, Portuguese, Spanish and Russian.
- NOTE (3) Choose between two majors, Physical Geography and Human/Regional Geography. + 14 3.5 credit

(adding to 100, codite) (17)(40) + 14 (48) = 680 + 672 = 1352 In-class hours

all elective

in 2004. Assume Same here using 2009

5.5 hs 130parcr >>

140/1

## Academic Departments, Fields of Study, Majors and Courses of Instruction

West Point 1995-96

The 13 academic departments of the Military Academy, under the direction of the Dean of the Academic Board, are organized to support the core curriculum as well as the over 25 fields of study and 19 optional majors offered at West Point.

The Commandant of Cadets oversees the Department of Military Instruction and the Department of Physical Education.

NOTE: For the courses described in this section, first-year courses are numbered in the 100s, second-year courses in the 200s, third in the 300s, and fourth in the 400s. Credit hours represent contact hours and associated preparation; e.g., 3.0 credit hours are assigned to a course that meets five times within a two week period and requires two hours preparation for each hour in class.

Gives Jue Myers number of 40 hrs /sem

1995-96

## Mathematical Sciences



COL David C. Arney Professor and Acting Head of Department of Mathematical Sciences

Mathematical Sciences Field of Study and Major

The Department of

lubematical Sciences

provides each cadet the protunity to gain the mathematical education sential to progressive ad continuing development throughout a career a Regular Army officer. Imphasis is placed on chieving intellectual iscipline, mastery of tasoning, understanding mathematical concepts,

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Mathematical Sciences

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The Department of Mathematical Sciences offers a wide range of elective courses which enable cadets to complete either a field of study or a major in the mathematical sciences. Depending on the interest of each cadet, programs of study generally are organized to focus on mathematics of the applied sciences, mathematics of operations research, or mathematics of computation.

Operations Research deals with the application of logical thought and quantitative methods to provide commanders and managers with a sound basis for decision-making. The focus of study at the Military Academy is on opitimization methods, applications of probability and statistics, and modeling. Cadets electing the Operations Research field of study or major must be in the MSE track and take the MSE systems engineering option in addition to operations research courses.

#### MA 100

Precalculus Mathematics
First Term-Prerequisite: None.
Prepares cadets with background
deficiencies in algebra and trigonometry for the core mathematics
program. Students who must begin their study of mathematics with
MA 100 are identified at time of
admission and will give up one
elective opportunity later in their
studies. 3 Credit Hours

#### Core Mathematics Program

MA 103 Discrete

Dynamical Systems and Introduction to Calculus Both Terms-Prerequisite: None. This course is the first of the mathematics core curriculum. It provides introduction to elementary matrix operations and matrix methods to solve systems of linear equations. Several applications of these topics are also studied. Over half of the course is devoted to topics and problems in the mathematics of discrete dynamical systems. Introductory material on modeling problems using difference equations motivates the study of solution techniques for these equations and the eventual study of the calculus. Concepts and techniques are discussed for

first-order linear and nonlinear

equations and higher order linear equations. Computer software is used to demonstrate and solve problems in both the matrix algebra and the discrete dynamical systems options of the course. 3 Credit Hours

40 his

MA 104-205 Calculus I and II

Both Terms-Prerequisite: MA 103. These are the second and third semesters of the mathematics core curriculum. These standard courses provide study of mathematics as an intellectual discipline, a foundation for the continued study of mathematics, and for the subsequent study of physical sciences, social sciences, and engineering. Topics in geometry, single variable and multivariable calculus, and elementary ordinary differential equations are studied. By the end of MA 104, the differential and integral calculus of a single variable and the solution of second-order, constant coefficient. nonhomogeneous ordinary differential equations are completed. MA 205 continues with parametric equations, applies the calculus to vector-valued functions, and studies multivariable calculus including multivariable optimization and iterated integrals. Computer software is used throughout the course. 9 Credit Hours

128 Ms

Operations Research Field of Study 40 has MA 206

Probability and Statistics Both Terms-Prerequisite: MA 205. This is the final course in the core mathematics program. It provides a professional development experience upon which cadets can structure their reasoning under conditions of uncertainty and presents fundamental probability and statistical concepts that support the USMA curriculum. Coverage includes descriptive statistics; basic probability concepts; discrete, continuous and joint random variables and their distributions; point and interval estimation; and hypothesis testing. Students make extensive use of computer software for statistical analysis. Academic projects are used in the course of review and apply concepts. 3 Credit Hours

MA 363 Ordinary Differential Equations

Both Terms—Prerequisite: MA 207. This course is a full semester course in ordinary differential equations. The first two thirds of the course is devoted to a study of transition and series solutions and solutions to systems of ordinary differential equations. The course concludes with a study of numerical methods. Heavy emphasis is placed upon analyzing a wide variety of practical applications that give rise to ordinary differential equations. 3 Credit Hours

MA 364

Engineering Mathematics
Both Terms-Prerequisite: MA 205.
This course provides additional
mathematical techniques and
deepens the understanding of
concepts in mathematics to support continued study in science
and engineering. Emphasis is
placed upon using mathematics
to gain insight into natural and
man-made phenomena that give
rise to problems in differential
equations and vector calculus.
Calculus topics focus on threedimensional space curves, vector
fields and operations, divergence



and curl, line and surface integrals. Topics in differential equations include systems of ordinary differential equations and numerical solutions. Introduction is made to classical partial differential equations. 3 Credit Hours

MA 366 Vector Calculus and Introduction to PDF

Spring Term-Prerequisite: MA 205. This course provides additional mathematical techniques and deepens the understanding of concepts in mathematics to support continued study in science and engineering. Emphasis is placed upon using mathematics to gain insight into natural and man-made phenomena that give rise to problems in differential equations and vector calculus. Calculus study focuses on vector fields, differential operators, and the vector integral theorems. This materal is used to derive the partial differential diffusion equation. Solution of this equation with Fourier series and separation of variables is then studied. 3 Credit Hours

MA 371 Linear Algebra
Second Term—Prerequisite: MA 205.
This course emphasizes the computational and theoretical aspects of linear algebra one encounters in many subjects ranging from economics to engineering. The course covers solutions of linear systems equations, the algebra of matrices, and the utility of determinants. The foundational aspects of vector spaces and linear depen-

Explanations prove helpful in mathematical science courses.

dence and independance, subspaces, bases and dimension, inner products, and othonormalization are developed. This is rounded out with a detailed investigation of eigenvalues and eigenvectors as they relate to diagonalizations, quadratic equations, and systems of differential equations. LU-decomposition, partial pivoting, and ill-conditioned matrices are also studied. A software package is used to compute solutions to problems. Applications of the course material are included in the form of special problems to illustrate its wide scope. 3 Credit Hours

MA 372
Discrete Mathematics

Second Term-Prerequisite: Completion or validation of the mathematics core curriculum. This course is an introductory examination of the underlying mathematical structures of the computer sciences. Designed primarily for both the mathematician and computer scientist, the course includes propositional logic, elements of set theory, combinatorics, relations, functions, methods of proof, induction and recursion, graph theory, trees, and algebraic systems. Specific applications to computer science and fields of engineering are presented. 3 Credit Hours

MA 376 Applied Statistics

First Term-Prerequisite. MA 206 This course builds on the foundations presented in the core probability and statistics course to provide a broad introduction to procedures in applied statistics. The text used is the same as for the core course. Topics covered include hypothesis testing, analysis of variance, categorical data analysis, regression analysis, and non-parametric methods. mathematical basis for each topic is presented. Two special problems are used to provide opportunities to apply those techniques

outside the classroom. For one the special problems students; choose an application in their sefield. 3 Credit Hours

MA 381

Nonlinear Optimization
First Term—Prerequisite MA 25
This course provides an undegraduate presentation of nonline
topics in applied mathematic.
These topics include a review convex functions, minima as
maxima of convex functions to the continuity conditions search menods, and an introduction to the coulus of variations. One special problem in optimization from a discipline. 3 Credit Hours

MA 386 Introduction to Numerical Analysis First Term-Prerequisite Co tion or validation of the math ics core curriculum. The comp capabilities and limitations in erating numerical solutions mathematical problems will analyzed critically. Numerical se rithms will be examined and accuracy appraised After tailed study of error analysis following topics are studied: tions of equations in one varia the use of polynomials to appr mate discrete data, curve and the approximation of con ous functions. 3 Credit Hours

MA 387

Mathematical Analysis I Second Term-Prerequisite Con tion or validation of the math core curriculum. A one sen course providing a rigorous for dation for the calculus of a sm variable. The course is desc to introduce the student to language and techniques of m ern mathematics. Course cov age includes a treatment of foundations of the real num system, an intensive study of quences, convergence, con ity, and their consequences, and rigorous development of differe tial calculus. 3 Credit Hours



Solving problems in numerical differentiation and integration is a challenge.

Mathematical Modeling

th Tems-Prerequisite: Complenorvalidation of the mathematics recurriculum. A study of the use undergraduate mathematics to an a solution to realistic probs in areas such as economics, meering, social sciences, and erations research. The course uses on the development of thematical models and the building process. Cadets e computer software packs (such as MINITAB) in model ing and empirical modeling, and New Pascal for work in simula-In The calculus, differential

quations, graphical analysis, and dementary optimization are some the mathematics employed in the model building process.

Credit Hours

MA 396 Numerical Methods The Solution of Ordinary Inferential Equations

nd Term-Prérequisite: Complenorvalidation of the mathematics e curriculum. The study and plementation of algorithms demed to approximate solutions mathematical problems requirdifferentiation, integration, or solution of an initial-value or aundary-value problem involving ordinary differential equation. er an introduction to error analye cadet uses solutions to the ng problems: numerical difrentiation and integration, ini-I-value problems for ordinary terential equations, and bound--value problems for ordinary difntial equations, 3 Credit Hours

MA 397 Advanced Individual Research in Mathematics

Summers-Prerequisite: Permission of the Head of the Department of Mathematics. This course is an individually supervised research and study program conducted at approved laboratories throughout the United States during the summer. It is designed to familiarize students with advanced problem solving and to acquaint them with the essential features of independent research in mathematics. Subject areas are agreed upon with the sponsoring laboratory. Evaluation is based upon reports form the sponsoring laboratory, and oral and written reports presented by cadets to the faculty of the Department of Mathematics. Up to 3 Credit Hours

MA 476

Mathematical Studies

Second Term-Prerequisite: MA 206. This course builds on the foundations presented in the core probability and statistics course to provide a mathematical presentation of the important topics in mathematical statistics. The course begins with a review of some of the probability concepts from the core probability and statistics course, adding additional topics such as transformations of random variables and moment generating functions. To provide the mathematical basis for much of statistical practice, certain limit theorems and sampling distributions are discussed. The central focus of the course is on decision theory, the theory of estimation and the theory of hypothesis testing. 3 Credit Hours

MA 481 Linear Optimization

Second Term—Prerequisite: Completion or validation of the mathematics core curriculum. A study of optimal solutions to linear algebraic systems using the simplex method of linear programming. This includes an analysis of the dual problem, parametric programming and post optimal analysis. Additional topics such as graphs and the transportation problem network models, and goal programming are introduced. 3 Credit Hours

MA 484 Partial
Differential Equations

First Term—Prerequisite: MA 364. Devoted to the solution of partial differential equations, the course has applications in virtually all physical science fields and should be of interest to mathematics, science, and engineering concentrators. Several classic differential equations of mathematical physics will be studied, to include separation of variables, Fourier series, Laplace transforms, and numerical methods. 3 Credit Hours

MA 485 Complex Analysis Second Term—Prerequisite: Completion or validation of the standard program and permission of Department Head. Development of the classical theory providing a basis for the study of applications including contour integrals, conformal mapping, and the solution of the Dirichlet and Neumann problems. Motivating problems are drawn from fluid dynamics, heat conduction, elasticity, and other branches of mathematical physics.

3 Credit Hours

MA 487

Mathematical Analysis II
First Term-Prerequisite: MA 387
Continuation of MA 387. Completes the student's rigorous foundation in the calculus of a single variable. Course coverage includes a rigorous development of integral calculus, to include both Riemann-Stieltjes integration, and an intensive study of infinite series and function sequences. 3 Credit Hours

MA 488

Visiting Professor's Course Both Terms—Prerequisite: To Be Announced. A Visiting Professor of Mathematics will conduct a course on a topic to be announced. 3 Credit Hours

MA 489 Advanced Individual Study in Mathematics

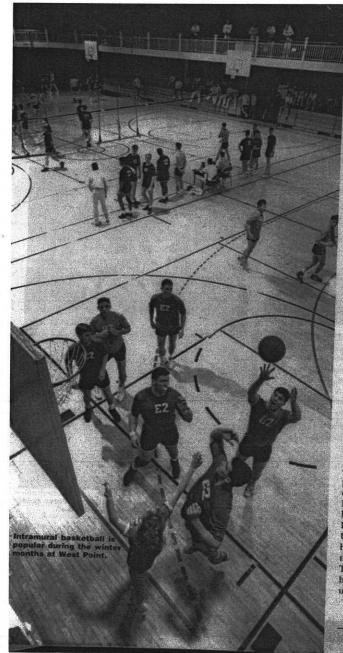
Both Terms and Summer-Prerequisite: Permission of Head of Department. An intensive tutorial course of an advanced individual project offered to a limited number of highly qualified cadets who have completed available mathematics elective courses. Course work is tailored to meet individual desires. 3 Credit Hours

MA 491 Research Seminar in Applied Mathematics Projects

Both Terms-Prerequisites: MA 262, MA 391, and consent of instructor. The student integrates the mathematical concepts and techniques learned in previous courses with the principles developed in the whole USMA curriculum to solve a current problem of interest to the Academy or other agencies in the Department of the Army. Course will culminate with a student presentation and a paper prepared to send to the "using" agency, 3 Credit Hours

MA 492 Topics in Discrete Mathematics and Algebra Both Terms—Prerequisite: Permission of the Head of Department. Provides cadets the opportunity to study selected subjects in the finite structure of the mathematical sciences. 3 Credit Hours

MA 493 Topics in Analysis Both Terms—Prerequisite: Permission of the Head of Department. Provides cadets the opportunity to study selected subjects in the areas of real, complex, or numerical analysis. 3 Credit Hours



The Department of Physical Education (DPE) is responsible for administering a comprehensive, four-year physical education program. Every cadet will complete all baseline requirements in physical education instruction prior to graduation. The progression begins the first year with combatives (boxing for men, selfdefense for women), swimming and gymnastics, and a lecture course entitled "The Fundamentals of Physical Fitness", which focuses on fitness and health principles. Lifetime sports, activities cadets may engage in for the rest of their lives, receive progressively greater emphasis during upperclass years. Among such sports and activities are aerobics, badminton, basketball, cycling, golf, handball, ice skating, racquetball, senior life saving, skiing, squash, strength development, tennis, volleyball, and water safety instruction. Upperclass cadets also participate in a mandatory combative program. Women receive instruction in self-defense and close quarters combat, while men receive instructions in wrestling and close quarters combat. Upperclass cadets are also introduced to various instructional and coaching techniques which build confidence and provide valuable leadership experiences. Additionally, the Master Fitness Trainer concepts have been incorporated into the Physical Education curriculum. Upon graduation every cadet will have had the opportunity to earn the skill identifier "Master Physical Trainer" which will enable him/ her to correctly develop and lead unit fitness programs in the Army.

A Department of Physical Educa-tion instructor is assigned to each codet company as a guidance counselor. This counselor maintains a comprehensive physical progress record on each cadet. The guidance counselor assists in developing conditioning programs for cadets having difficulty attaining minimum standards in course work or on physical fitness tests as well as assisting those wishing to excel. At the completion of four years cadets are not only prepared to develop physical conditioning programs for themselves but have received extensive instruction throughout the DPE curriculum and summer training experiences on how to develop a unit physical conditioning program.

Intramural Athletics

The intramural athletic program is administered by the Department of Physical Education (DPE) At 4:00 p.m. every Monday through Thursday, the "Fields of Friendly Strife" are flooded with intramural athletes. Each cadet will compete twice a week during one or two intramural seasons per term. Intramurals give every cadet a chance to develop leadership, strength, coordination, and endurance as well as an opportunity to reduce stress and have some tun. The early fall season consists of competition in football (full con-tact), basketball (3 on 3), soccer, and team handball. Late fall competition consists of competition in 5'10" basketball, racquetball and wrestling. The winter season in-cludes competition in area hockey, basketball, boxing, wallyball, and swimming. Spring competition consists of flickerball, rugby, softball and cross country.

7 credit Education

178 hrs

Professor and Master of the Sword Department of Physical Education

PE 100 Foundations of Physical Education (Men-Spans First and Second Term)

PE 101 Foundations of Physical Education (Women-Spens First and Second Term) Prerequisite: None. Provides basic instruction in four core courses. These standard courses emphasize the development of basic physical skills. The core subcourses are: Swimming, Gymnastics. Fundamentals of Personal Fitness and Combatives (Boxing for men and Self Defense I for women). 3.0 Credit Hours

PE 200 Advanced Skills Development/Unit Fitness (Men-Spans First and Second Term)

PF 201 Advanced Skills Development/Unit Fitness (Women-Spans First and Second Term) Prerequisite: PE 100/101.
Provides advanced development of physical skills and cultivates student's optimum physical capa-bility and personal health knowledge so that each student can meet the physical requirements of the military profession and maintain a healthy lifestyle. Teaches students how to assist commanders in devel-oping sound physical fitness pro-grams. The sub-courses include Combatives [men-Wrestling and Close Quarters Combat; wor Self Defense II and Close Quarters Combat) and Unit Fitness, Students' personal fitness is asse throughout the course by taking the APFT twice and the Indoor Obstacle Course once, 2,0 Credit Hours

Lifetime Sport Development (Men-Spans First and Second Term)

Lifetime Sport Development (Women-Spans First and Second Term) Prerequisites: PE 200/201. Provides basic Instruction in one lifetime sport permitting each stu-dent to develop a skill leading todent to develop a skin leading un-ward the mastery appropriate for a physical activity. Student personal fitness is assessed throughout the course by taking the APT twice. 1.0 Credit Hours

PE 400 Leadership Through Lifetime Sport Development (Men-Spans First and Second Term)

PE 401 Leadership Through Lifetime Sport

Development
(Women-Spans First and Second
pp. ann/301. Term) Prerequisite: PE 300/301. Provides development of a sec-ond lifetime sport permitting each student to develop a level of skill leading toward the mastery ap-propriate for a lifetime of participropriate for a lifetime of participation in sport and physical activity. Students physical fitness is assessed throughout the course by taking the APFT twice and the IOCT once. 1.0 Credit Hours