

HEALTH, EXERCISE AND SPORT SCIENCES

<http://www.pacific.edu/Academics/Schools-and-Colleges/College-of-the-Pacific/Academics/Departments-and-Programs/Health-Exercise-and-Sport-Sciences.html>

Phone: (209) 946-2209

Location: Main Gym

J. Mark VanNess (mvanness@pacific.edu), Department Chair; and Courtney Jensen (cjensen1@pacific.edu), Graduate Director.

The graduate program in Health, Exercise and Sport Sciences provides for scholarly study in Health and Exercise Science, Exercise Physiology and Human Performance. Each area of emphasis contains a blend of core and elective courses, enabling graduate students to design their program of study to meet their personal research and educational goals. These elective courses may be selected from other departments, including but not limited to Biology, Chemistry, Communications, Education and Psychology. Each graduate student is provided with the choice between comprehensive exams or a thesis project as their capstone experience. All graduate students are encouraged to include experiential learning, collaborative research, internships and overseas experiences in their program of study.

Programs Offered

Master of Arts:

- Health & Exercise Science

Admission Requirements

1. Undergraduate degree in health, exercise and sport sciences, a related discipline, or completion of essential undergraduate prerequisites, as determined by the Graduate Directors.
2. Minimum 2.65 GPA (Cumulative *and* Major)
3. 2 Letters of Recommendation
4. Personal Essay/Statement
5. Official copies of Transcripts
6. Resume/CV

**No GRE required

Communication Skills

1. Prepare and deliver presentations effectively.
2. Write clearly, critically and persuasively.

Leadership and Collaboration

1. Work and collaborate in groups toward a common goal.

Critical and Creative Thinking

1. Read, select and interpret important information from health, exercise & sport sciences literature.
2. Design and conduct research studies using appropriate methodologies.

Ethical Reasoning

1. Identify and apply ethical standards to the design and execution of research studies.

Master of Arts in Health, Exercise and Sport Sciences

Candidates have the choice of completing the Thesis Route or the Comprehensive Exam Route:

Thesis Route

Students must complete a minimum of 32 units with a Pacific cumulative and major/program grade point average of 3.0 in order to earn the master of arts degree in health, exercise and sport sciences. Twenty (20) of these units must be completed in health, exercise and sport sciences courses. Twelve (12) units may be completed in other departments.

Courses must be graded B- (2.7) or higher to be counted toward the degree program.

HESP 279	Research Methods in Sport Sciences	4
HESP 299	Thesis	4
Four HESP required classes (dependent on area of emphasis)		16
Two HESP approved electives (units must all be at the 200 level)		8
Total Hours		32

Notes:

- 1) Fulfillment of the prerequisite requirement for HESP 279 : i.e., completion of a course in statistics or an introduction to research course that involves statistical analysis of data, with a B- or better.
- 2) Units received for meeting this prerequisite requirement may not be included among the minimum units required for the master's degree.
- 3) Courses may be taken concurrently.

Thesis Notes:

- 1) Thesis candidates select a Thesis Chair on the basis of shared research interests/methodologies.
- 2) In consultation with their Thesis Chair, the thesis candidate selects their thesis committee members. The thesis committee should include a minimum of three members. A committee member may be selected from outside the department when an area of study crosses disciplinary lines.
- 3) Thesis candidates present an open colloquium that outlines the proposed thesis problem and basic research design. The colloquium must be successfully passed in the candidate's 1st year Spring semester. In the event the candidate fails to pass the colloquium, they are immediately placed on the comprehensive exam route.
- 4) Thesis candidates must satisfactorily complete thesis during their final semester or maintain continuing registration status until completed. Thesis are prepared in manuscript format, ready for submission to a peer-reviewed academic journal following the final oral exam.
- 5) Must satisfactorily complete an open final oral examination encompassing the thesis and general professional knowledge.

Comprehensive Exam Route

Students must complete a minimum of 32 units with a Pacific cumulative and major/program grade point average of 3.0 in order to earn the master of arts degree in health, exercise and sport sciences. Twenty (20) of these units must be completed in health, exercise and sport sciences courses.

Twelve (12) units may be completed in other departments. Candidates must successfully pass a written comprehensive exam in all classes that contribute towards graduation.

Courses must be graded B- (2.7) or higher to be counted toward the degree program.

HESP 279	Research Methods in Sport Sciences	4
Four required HESP classes (dependent on area of emphasis)		16
Three HESP approved electives (Units must all be at the 200 level)		12
Total Hours		32

Notes:

1) Fulfillment of the prerequisite requirement for HESP 279 : i.e., completion of a course in statistics or an introduction to research course involving statistical analysis of data, with a B- or better.

2) Units received for meeting this prerequisite requirement may not be included among the minimum units required for the master's degree.

3) Courses may be taken concurrently.

Comprehensive Exam Notes:

1) Candidates will sit comprehensive exams at the end of each academic year they are enrolled at Pacific.

2) Comprehensive Exam questions are completed for each graduate class the candidate takes in that academic year. Candidates are provided with the questions a minimum of 5 weeks in advance of the scheduled exam date. In consultation with the relevant graduate faculty member, candidates are permitted to prepare outlines for each question set. These outlines are not permitted in the exam itself. A one-page bibliography is permitted for each scheduled exam session. The bibliography will be surrendered to the Graduate Directors at the completion of the exam.

3) Candidates are permitted 1 opportunity to re-sit any failed exam questions.

4) In the event that the candidate fails the re-sit, they must complete an additional 1 unit Independent Study class (in the content area of the failed question) and pass a comprehensive exam in this class.

5) The results are transmitted to the candidate in writing.

6) The Graduate Directors serves as the coordinator of the Comprehensive Exams.

Additional information:

1. All graduate students are assigned a faculty advisor by their respective Graduate Director.
2. Candidates meet with their faculty advisor twice a year to create their individual plan of study.
3. All independent studies and/or independent research must be reviewed and approved by their respective Graduate Director **prior to registration.**
4. Dates for open colloquiums and final oral examinations are coordinated through the Thesis Advisors.
5. Dates for written comprehensive examinations are coordinated through the Graduate Directors.

Hlth, Exercise Sprt Sci Courses

HESP 110. Health and Exercise Science Law. 4 Units.

This course examines legal issues and responsibilities relevant to health and exercise science professionals. This course is divided into two parts. Part I introduces basic concepts of the legal system and reviews general legal principles of tort and contract law. Part II focuses upon specific topics to which legal principles and risk management strategies apply. This course is taught combining lecture, class discussions, and experientially based assignments designed to develop the ability to practically apply circumstance to the law and risk management planning. In-class oral arguments using relevant case law, review of local facilities and programs, and legal observations in San Joaquin County courtrooms will supplement course content and offer students "hands on" learning opportunities.

HESP 129. Exercise Physiology. 4 Units.

This course is designed to introduce Health and Exercise Science students to core physiological concepts relevant to acute and long-term adaptations to the stress of exercise. An overview of metabolic, cardiovascular, respiratory, and skeletal muscle adaptations will be discussed along with special topics such as environmental stressors, obesity, and nutrition. Outside laboratory assignments are carried out for the purpose of applying lecture to practice and providing "hands on" opportunities to develop basic competencies in the interpretation of laboratory testing in exercise physiology. Lab fee required.

HESP 131. Assessment and Evaluation. 4 Units.

This course is the development of competencies of Health, Exercise and Sport Sciences majors for the design and implementation of procedures to appropriately measure and evaluate students, clients and/or programs. Basic data acquisition methods and statistical analysis techniques are presented. A Lab fee is required.

HESP 133. Kinesiology. 4 Units.

This course is a functional study of musculoskeletal anatomy and its relationship to human movement, posture, exercise prescription, and rehabilitation. Prerequisite: BIOL 011 or BIOL 051 or BIOL 061 or permission of instructor, and lab fee required.

HESP 135. Nutrition and Metabolism. 4 Units.

This course provides a thorough study of the principles of nutrition as they relate to health of individuals who participate in sports or physical activity. Topics include calculating energy balance and the role of carbohydrates, lipid, protein, vitamins, minerals and water in sports performance. The application of these topics for optimal metabolic functioning to a variety of physical activities is also presented. Prerequisites: HESP 129; BIOL 011 or BIOL 061.

HESP 137. Psycho-Social Aspects of Health Care. 4 Units.

Students study comprehensive, integrated coverage of psychosocial topics in healthcare involving clients, families, and other caregivers affected by pathology, impairment, functional limitations, and/or disability. This course will have a broad coverage of topics in healthcare including multicultural issues, spirituality, chronic condition, abuse/neglect, and PTSD. Emphasis will be placed on current, evidence-based literature, connecting theory to practice.

HESP 141. Sport, Culture and U.S. Society. 4 Units.

This course is designed to explore the relationship between sport, culture and society in both the USA and the broader global world. Students learn to critically examine a wide range of topics that include, but not limited to, sport and gender, sport and race, global sports worlds, drugs and violence in sport, sport and politics and the crime-sport nexus. The intention of this course is to develop the student's sociological imagination and encourage the student to think critically about the role sport plays in the development of societies, ideologies and everyday life. (DVSY, ETHC, GE1B, GEND)

HESP 143. Prevention and Acute Care of Injury and Illness. 4 Units.

This course provides an overview of the field of Athletic Training, its organization, and the responsibilities of a Certified Athletic Trainer (AT) as part of the sports medicine team. Instruction emphasizes prevention, recognition, and immediate care of injuries and illnesses associated with physical activity. This course is recommended for freshmen.

HESP 145. Therapeutic Modalities. 4 Units.

This course is a lecture and laboratory experience designed to expose the student to the theory, principles, techniques and application of therapeutic modalities pertaining to the treatment of athletic or activity related injuries. Topics include discussions of the physiological effects, indications, contra indications, dosage and maintenance of each modality. Recommended: BIOL 081. Lab fee is required. Junior standing.

HESP 146. Health, Disease, and Pharmacology. 4 Units.

This course is an in-depth exploration of physical, mental, and social health with specific emphasis on recognizing the signs, symptoms, and predisposing conditions associated with the progression of specific illnesses and diseases as they relate to the physically active individual. Students also develop an awareness of the indications, contraindications, precautions, and interactions of medications used to treat those illnesses and diseases.

HESP 147. Muscle Physiology. 4 Units.

This course is focused on skeletal muscle physiology. Topics include the structure and function of muscle tissue, protein synthesis, cell signaling cascades, the specificity of adaptation, enzymes and their roles in metabolism, endocrine function, anabolic steroids, muscle damage, inflammatory physiology, neuromuscular principles (e.g., size principle), and the mechanisms of muscle fatigue. Laboratory assignments focus on skeletal muscle testing and evaluation. Prerequisite: HESP 129 and upper-division class standing. Lab fee required.

HESP 149. Clinical Evaluation and Diagnosis I. 3 Units.

This course presents an in-depth study of musculoskeletal assessment of the lower extremity, thoracic and lumbar spine for the purpose of identifying (a) common acquired or congenital risk factors that would predispose an individual to injury and/or (b) musculoskeletal injury common to athletics or physical activity. Students receive instruction in obtaining a medical history, performing a visual observation, palpating bones and soft tissues, and performing appropriate special tests for injuries and conditions of the foot, ankle, lower leg, knee, thigh, hip, pelvis, lumbar and thoracic spine. This course is directed toward students who pursue athletic training and/or physical therapy professions. Prerequisite: HESP 133 or BIOL 071, and a lab fee is required.

HESP 150. Clinical Evaluation and Diagnosis II. 3 Units.

This course presents an in-depth study of musculoskeletal assessment of the upper extremity, cervical spine, head and face for the purpose of identifying (a) common acquired or congenital risk factors that would predispose an individual to injury and/or (b) musculoskeletal injury common to athletics or physical activity. Students receive instruction in obtaining a medical history, performing a visual observation, palpating bones and soft tissues, and performing appropriate special tests for injuries and conditions of the shoulder, upper arm, elbow, forearm, wrist, hand, fingers, thumb, cervical spine, head, and face. This course is directed toward students who pursue athletic training and/or physical therapy professions. Prerequisites: HESP 149; HESP 133 or BIOL 071. Lab fee is required.

HESP 151. Elementary Physical Education. 3 Units.

This course is designed to prepare students for employment in an elementary school setting and provide them with the tools necessary to formulate and implement a comprehensive elementary PE experience for all students. Participants learn a wide range of teaching skills that facilitate the ability to create a quality active learning environment in elementary PE. Students explore effective teaching and assessment strategies, classroom management skills, the use of constructive feedback, the negotiation of diverse classrooms and the development of appropriate student learning outcomes. Students also are introduced to the subject matter of elementary PE and will undertake several teaching episodes. This course encourages students to engage in reflexive teaching practices, develop physically educated young people, maximize student involvement and enjoyment in PE and integrate core curriculum subject matter into PE lessons.

HESP 155. Motor Development and Learning. 3 Units.

This course examines aspects of skilled performance and motor learning from a developmental perspective. It is concerned with the major principles of human performance and skill learning, the progressive development of a conceptual model of human actions and the development of skill through training and practice. Topics include human information processing, decision-making and movement planning, perceptual processes relevant to human movement, production of movement skills, measurement of learning, practice design, preparation, organization, and scheduling; use of feedback, in addition to the application of motor learning principles to sport, physical education, industrial and physical therapy settings. Fieldwork requires clearance for local school districts (clear LiveScan fingerprint screening and negative TB test results).

HESP 157. The Clinician in Health and Exercise Science. 4 Units.

This course integrates theory and practice and requires students to develop a research topic, consistent with an explicitly and narrowly defined area of interest. Permission of the instructor is required.

HESP 159. Health Optimizing Physical Education. 3 Units.

This course introduces prospective physical education teachers to the principles and components of health-related fitness, appropriate curriculum for K-12 programming, comprehensive school and community-based physical activity planning, effective teaching principles, behavior change strategies, and advocacy approaches of physical activity and fitness. Prerequisites: HESP 131 and HESP 151.

HESP 160. Principles of Coaching. 3 Units.

This course is designed as an introduction to the principles of athletic coaching for modern day athletes. Emphasis is on a holistic approach to the theories, knowledge, and practices of coaching sport as prescribed by the National Standards for Sport Coaches. This course will explore coaching at various levels. Topics will include developing a coaching philosophy, evaluating theories in student-athlete motivation, understanding team dynamics, leadership, administration responsibilities, and improving player performance.

HESP 161. Biomechanics of Human Movement. 4 Units.

This course is an introduction to the biomechanics of human movement and the analytic procedures and techniques for subsequent application in the sport sciences and related fields. The course includes a review of basic functional/mechanical human anatomy and kinesiology. Outcome objectives are an understanding of mechanical principles governing human movement, skill in use of a variety of measurement techniques commonly applied in biomechanics, an ability to analyze motor skill performance via cinematographic/ computer methodologies and skill in prescriptively communicating results of analysis. Prerequisite: BIOL 011 or BIOL 051 or BIOL 061 or permission of instructor, and a lab fee is required.

HESP 163. Therapeutic Exercise and Rehabilitation. 4 Units.

This course is an application of the theory and principles associated with therapeutic exercise and the application of various rehabilitation techniques and procedures during the course of an athlete's rehabilitation to attain normal range of motion, strength, flexibility, and endurance. Prerequisite: BIOL 071; HESP 133 or permission of instructor, and a lab fee is required.

HESP 173. Health Care Management and Professional Development. 4 Units.

This course is an in-depth study of the management of health care organizations related to finances, facilities, equipment, organizations structures, medical/insurance records, risk management, human relations, and personnel. Practical and conceptual skills are taught to help students focus on more efficient health care delivery. Also covered is the development of leadership skills, future trends in health care management, guidelines for designing effective work groups and managing conflict.

HESP 177. Cardiovascular Physiology. 4 Units.

This course seeks to fulfill two main objectives: 1) to establish a foundational understanding of clinical cardiovascular physiology and 2) to be able to perform and interpret cardiopulmonary exercise tests to examine cardiac, metabolic and respiratory pathology. Prerequisite: HESP 129 and upper division class standing. Lab fee required.

HESP 179. Introduction to Research. 4 Units.

This course covers the rationale for and status of professional research; research designs and their applicability to students' disciplines, review, critique and synthesis of selected literature; development of research proposal and pretest of instrument.

HESP 180. Epidemiology. 4 Units.

This course is an introduction to the principles and practice of epidemiology. It explores the history, concepts, and methods of epidemiologic investigation. The statistical models taught in this class include the receiver operating characteristic curve, chi-square test, t-test, binary logistic regression, and linear regression. Students will learn to develop research designs that employ these tests and will be able to conduct them to evaluate patient care, quantify risk, and understand the patterns of illness and disease in populations.

HESP 182. Exercise Testing and Prescription. 4 Units.

This course is primarily designed to provide students with the hands-on training and theoretical background to competently assess levels of wellness/fitness in an "apparently healthy" (i.e. low risk) adult population. The topics and skills addressed include health screening protocols/risk stratification, use of Informed Consent documents, as well as measurement protocols for the health-related components of fitness (i.e. cardiorespiratory fitness, muscular fitness, flexibility, body composition). These skills are then used to prescribe lifestyle and/or exercise modifications that result in individual progress toward a desired goal. Prerequisite: HESP 129.

HESP 187. Internship in Health and Exercise Science. 4 Units.

This course provides an opportunity for qualifying students to work in an area of Health and Exercise Science that interests them. Prerequisites: HESP 157, GPA 2.0, no grade below "C-" in major, and approval of course supervisor.

HESP 187F. Internship. 1-4 Units.**HESP 187G. Internship. 1-4 Units.****HESP 189. Practicum: Coaching. 1 or 2 Unit.**

The practicum offers non-classroom experiences in activities related to Sports Sciences, under conditions determined by the appropriate faculty member. HESP 189 represents advanced practicum work involving increased independence and responsibility. Enrollment is limited to eight units maximum of HESP 089/189A, B, C, D, H, J, K offerings and no category within a course may be repeated for credit. A list of specific courses follows. Grading option is Pass/No Credit only.

HESP 189B. Practicum: Athletic Training III. 4 Units.

This is a clinical education course in the field of athletic training. It incorporates an experiential learning environment designed to prepare students for a career in athletic training. Advanced skills are introduced within the daily operations of the athletic training room and in the care of the athletes. Criteria for progression must be met before enrolling in subsequent practicum course. Prerequisite: HESP 089K.

HESP 189C. Practicum: Biomechanics. 2 Units.

These courses provide advanced practicum work in Sport Medicine. See HESP 089 for subcategories and enrollment limitations. Grading option is Pass/No Credit only.

HESP 189D. Practicum: Exercise Physiology. 2 Units.

These courses provide advanced practicum work in Sport Medicine. See HESP 089 for subcategories and enrollment limitations. Grading option is Pass/No Credit only.

HESP 189F. Practicum: Coaching. 2 Units.

Students are assigned to an intercollegiate or interscholastic sports team for the semester and participate in practice sessions throughout the specific sport season. Written guidelines are developed cooperatively by the supervisor, coach and student. Prerequisites: HESP 139 and HESP 155.

HESP 189H. Practicum: Sports Law. 2 Units.

These courses provide advanced practicum work in Sport Medicine. See HESP 089 for subcategories and enrollment limitations. Grading option is Pass/No Credit only.

HESP 189J. Practicum: Kinesiology. 2 Units.

These courses provide advanced practicum work in Sport Medicine. See HESP 089 for subcategories and enrollment limitations. Prerequisite: HESP 133 with a "C-" or better. Grading option is Pass/No Credit only.

HESP 189K. Practicum: Athletic Training IV. 4 Units.

This is the fourth in a series of four consecutive clinical education courses in the field of Athletic Training. The course incorporates an experiential learning environment designed to prepare students for a career in Athletic Training. Advanced Athletic Training knowledge and skills will also be introduced within the daily operations of the Athletic Training Facility and your Clinical Assignment and in the care of patients. Prerequisite: HESP 189B.

HESP 191. Independent Study. 1-4 Units.**HESP 193. Special Topics. 1-4 Units.****HESP 195. Ethical Issues in Sport. 3 Units.**

The primary goal of this course is to enhance student awareness regarding their values, their evolving moral and ethical codes, and the ways of addressing moral problems. Students examine various ethical theories and questions encountered in the field of Sport Sciences. As part of this course, students need to identify necessary information from various sub-disciplines in order to make professional and ethical decisions. Senior standing.

HESP 197. Independent Research. 1-4 Units.**HESP 200. Advanced Health and Exercise Science Law. 4 Units.**

This course examines legal issues and responsibilities relevant to health and exercise science professionals. This course is divided into two parts. Part I introduce basic concepts of the legal system and reviews general legal principles of tort and contract law. Part II focuses upon specific topics to which legal principles and risk management strategies apply. This course is taught combining lecture, class discussion, a written research project, and experientially based assignments designed to develop the ability to practically apply specific circumstances and facts to the law and risk management planning. In-class oral arguments using relevant case law, review of local facilities and programs, and legal observations in San Joaquin County courtrooms will supplement course content and offer students "hands on" learning opportunities.

HESP 233. Advanced Kinesiology. 4 Units.

This graduate seminar considers the musculoskeletal analysis of human movement, posture, exercise prescription, and rehabilitation. Prerequisite: HESP 133 or permission of instructor. Graduate standing.

HESP 235. Graduate Nutrition/Exercise Metabolism. 4 Units.

Students study the principles of nutrition as they relate to health and participation in sport or physical activity. The course includes calculation of energy needs and expenditures, and the role of carbohydrates, fats, protein, vitamins, minerals, and water in sport and physical activity.

HESP 237. Advanced Sport Psychology. 4 Units.

This course provides a detailed examination of the theories and concepts that explain how the human psyche affects sport performance. Particular emphasis is given to the application of these concepts for coaches and athletes.

HESP 247. Advanced Exercise Physiology. 4 Units.

This course is an advanced study of physiological responses to exercise with emphasis on laboratory methods and procedures for testing and demonstrating these responses for research application. Lab fee is required. Prerequisites: HESP 147 and permission of the instructor.

HESP 248. Applied and Clinical Physiology. 4 Units.

This course is designed to study the fundamental principles of exercise testing and interpretation for high risk, healthy, and athletic populations. The course is structured to focus on the cardiovascular, metabolic, and pulmonary responses to aerobic exercise and implications for designing training programs to enhance health, fitness, and performance. This course serves as a foundation for clinical exercise science and the use of exercise testing in the study of cardiac, metabolic and respiratory pathology.

HESP 253. Advanced Adapted Physical Education. 4 Units.

This course provides the culminating learning experience for those teaching credential candidates who are completing the waiver program with an emphasis in adapted physical education. Lab fee required.

HESP 255. Advanced Motor Learning. 4 Units.

This graduate course examines both the information processing and dynamical systems approaches to the study of human motor behavior and skill acquisition. Content is theoretically and research based with a behavioral emphasis. Topics covered include: variability and motor control, visual control of action, the role of reflexes, task interference, limitations in information processing, effects of stress on performance, and the Schema theory. It is intended to provide students with an advanced understanding of the conceptual, functional properties of the motor system and human motor performance and their application to teaching, coaching, industrial and therapeutic settings.

HESP 257. Advanced Clinician in Sports Medicine. 4 Units.

This course integrates theory and practice and requires students to develop a research topic, consistent with an explicitly and narrowly defined area of interest. Prerequisite: Permission of instructor.

HESP 261. Advanced Biomechanics of Sport. 4 Units.

This course is an advanced study of mechanical principles which influence human movement. Both non-cinematographic and cinematographic/videographic techniques are used to analyze and evaluate motor skills and errors in performance and critical evaluation of current research findings in biomechanics. Lab fee required. Prerequisite: an undergraduate course in kinesiology or biomechanics or permission of instructor.

HESP 279. Research Methods in Sport Sciences. 4 Units.

This in-depth evaluation of the various methods used in the disciplines of the sport sciences, includes experimental, descriptive, qualitative and historical approaches. Students learn the means of selecting a research problem and planning its solution as well as important considerations to regard in reviewing the literature. The course also includes an overview of proper form and style in research writing. Student must complete a fully developed Research Proposal as part of this course. Prerequisite: a course in statistics. Graduate standing.

HESP 287. Advanced Internship: Sport Medicine. 4 Units.

This course provides an opportunity for qualifying students to work in an area of sports medicine that interests them. Prerequisites: HESP 257 with a "C" or better and permission of instructor. Graduate standing. Grading option is Pass/No Credit only.

HESP 289B. Advanced Practicum: Coaching. 2-4 Units.

This practicum offers non-classroom experiences in activities related to Sports Medicine, under conditions determined by the appropriate faculty member. HESP 189 represents advanced practicum work that involves increased independence and responsibility. Enrollment is limited to six units maximum of HESP 089/189A, B, C, D offerings and no category within a course may be repeated for credit. Grading option is Pass/No Credit only.

HESP 291. Independent Study. 1-4 Units.

HESP 293. Special Topics. 3 or 4 Units.

HESP 297. Independent Research. 1-4 Units.

HESP 299. Thesis. 4 Units.