

Physics

Chair, Department of Physics: Professor P. Das
 Acting Chair: Professor F. Harris
 Associate Professors: Agnew, D’Amato
 Assistant Professors: Altmann, Crider, Hargrove-Leak, Kamela
 Laboratory Manager: D. Thompson

Physics is the great intellectual web that underlies our understanding of the universe. Not only is a background in physics fundamental for all scientists, but it also develops a powerful set of mental tools that are invaluable in any field. Our majors pursue research into the mysteries of deep space, the subatomic world and the fascinating physics of everyday objects. They are also successful in business, engineering and a myriad of other careers thanks to the quality of mind that they develop while studying the most profound and engaging material there is — physics.

One of the great strengths of Elon’s physics program is the close working relationship between faculty and students. All students are encouraged to be involved in research activities. Currently, these include a study of particle physics, the microscopic properties of crystals, simulation of mechanical and dynamical systems, the history and philosophy of science, and many other projects. The department is very interdisciplinary with experience in science pedagogy, neuroscience, computational theory, engineering, astronomy, geology and environmental studies. Majors and minors can expect a diverse and interesting range of opportunities for coursework and research both within the traditional realm of physics and across disciplinary boundaries.

Our major course of study begins with a three-semester sequence that ranges from mechanics through electricity to basic nuclear physics and particle theory. Building on this base, we offer courses in the advanced theory of electromagnetic phenomena, the mysterious world of quantum mechanics and a wide range of other topical courses, including classical mechanics, mathematical physics, circuit design, thermodynamics, field theory, statistical mechanics, etc.

The Department of Physics offers A.B., B.S., and Engineering Physics degrees as well as a minor in physics. All students interested in majoring or minoring in physics should take PHY 113 in the fall semester of their freshman year.

If you are fascinated by the mysteries of the universe and excited by observation, problem solving and creative thought, then the Department of Physics is the place for you.

A Bachelor of Arts degree in Physics requires the following courses:

PHY 113	General Physics I with Calculus	4 sh
PHY 114	General Physics II with Calculus	4 sh
PHY 213	Introduction to Modern Physics	4 sh
PHY 301	Classical Mechanics and Dynamical Systems	4 sh
PHY 311	Classical Electrodynamics	4 sh
PHY 312	Electricity, Magnetism and Field Theory	4 sh
PHY 411	Quantum Mechanics	4 sh
MTH 121	Calculus and Analytic Geometry I	4 sh
MTH 221	Calculus and Analytic Geometry II	4 sh
MTH 321	Calculus and Analytic Geometry III	4 sh

TOTAL

40 sh

A Bachelor of Science degree in Physics requires the following courses:

PHY 113	General Physics I with Calculus	4 sh
PHY 114	General Physics II with Calculus	4 sh
PHY 213	Introduction to Modern Physics	4 sh
PHY 301	Classical Mechanics and Dynamical Systems	4 sh
PHY 311	Classical Electrodynamics	4 sh
PHY 312	Electricity, Magnetism and Field Theory	4 sh
PHY 411	Quantum Mechanics	4 sh
PHY 397-8	Physic Lab-Seminars	4 sh
MTH 121	Calculus and Analytic Geometry I	4 sh
MTH 221	Calculus and Analytic Geometry II	4 sh
MTH 321	Calculus and Analytic Geometry III	4 sh
PHY 499	Research	1 sh

Eight hours electives from the following:
(one course should be taken during the spring of the sophomore year): 8 sh

- PHY 211-212 Circuit Analysis/Lab
- PHY 302 Statistical Mechanics and Thermodynamics
- PHY 412 Relativity and Cosmology
- PHY 471 Special Topics in Physics

Competence in computer programming must be demonstrated.

TOTAL **53 sh**

A Bachelor of Science degree in Engineering Physics: See requirements listed under Engineering.

A minor in Physics requires the following courses:

PHY 113	General Physics I with Calculus	4 sh
PHY 114	General Physics II with Calculus	4 sh
PHY 213	Introduction to Modern Physics	4 sh
Select two Physics courses at the 300-400 level		8 sh

TOTAL **20 sh**

PHY 101. CONCEPTUAL PHYSICS **4 sh**

This course provides an introduction to the major ideas in both classical and modern physics. Students will be introduced to experiments of the ancient Greeks, Renaissance scholars and classical natural philosophers. The formulation of gravitational and mechanical theories, thermodynamics, the particle nature of matter and aspects of elementary electromagnetism will be included. Twentieth century perspectives including the theory of relativity, quantum mechanics and chaos will be studied. Laboratory included. Offered fall and spring.

PHY 102. INTRODUCTION TO ASTRONOMY **4 sh**

Astronomy examines the nature of light, astronomical instruments and our attempts to understand the origin of our solar system and its constituents: the sun, planets, asteroids, comets and meteors. Laboratory included. Offered fall and spring.

PHY 103. INTRODUCTION TO GEOLOGY **4 sh**

This geology course includes a study of the nature and origin of rocks and minerals, evolution of the landscape, plate tectonics, coastal dynamics and geologic time. Laboratory included. Offered fall and spring.

- PHY 105. THE PHYSICS OF SOUND** 4 sh
This course provides an introduction to oscillations and waves with applications to sound. It examines the scientific basis for “musical sound” the production of sound in musical instruments, recording studios’ use of the properties of sound and the acoustics of concert halls. Laboratory included. Offered fall and spring.
- PHY 110. ENERGY AND THE ENVIRONMENT** 4 sh
This course provides an introduction to energy concepts and the basic modes of energy production and use, focusing on environmental problems that are a consequence of such activities. Laboratory included. Offered fall and spring.
- PHY 111, 112. GENERAL PHYSICS I AND II (each semester)** 4 sh
Designed for students majoring in the biological and/or health-related sciences, this survey of classical and modern physics includes mechanics, waves, heat, electricity, magnetism, optics, and atomic and nuclear physics. Labs included. Prerequisite: MTH 100 or placement exemption. Prerequisite for PHY 112: PHY 111. PHY 111 offered fall; PHY 112 offered spring.
- PHY 113, 114. GENERAL PHYSICS I AND II WITH CALCULUS (each semester)** 4 sh
This survey of topics in classical physics is designed for students majoring in math, physics or chemistry or planning to transfer into an engineering program. Topics include kinematics, dynamics, thermodynamics, electrostatics, electrodynamics and waves. Labs included. Prerequisite for PHY 114: PHY 113. Corequisite: MTH 121. PHY 113 offered fall; PHY 114 offered spring.
- PHY 117-118. FRESHMAN PHYSICS LAB**
This one-year sequence of laboratory experiences accompanies either PHY 111, 112 or 113, 114. PHY 117 (which must be taken at the same time as PHY 111 or 113) covers mechanical systems and thermodynamics. PHY 118 (which must be taken at the same time as PHY 112 or 114) explores the world of electricity and magnetism as well as geometrical optics. PHY 117 is taught in fall; PHY 118 is taught in spring. Corequisite PHY 111, 112 or 113, 114.
- PHY 211. CIRCUIT ANALYSIS** 3 sh
This course is an introduction to the theory, analysis and design of electric circuits. Studies include circuit parameters and elements: voltage, current, power, energy, resistance, capacitance and inductance. Also included is the application of Kirchhoff’s laws to simple and complex circuits and the study of the steady-state and transient response of circuits to pulse, step and periodic inputs. Prerequisites: MTH 221 and PHY 114. Corequisite: EGR/PHY 212.
- PHY 212. CIRCUIT ANALYSIS LAB** 1 sh
This course involves laboratory application of concepts and principles discussed in EGR/PHY211. Corequisite: EGR/PHY 211.
- PHY 213. INTRODUCTION TO MODERN PHYSICS** 4 sh
A continuation of PHY 113 and PHY 114, this course provides further study of wave dynamics, special relativity, early quantum mechanics, wave mechanics and an introduction to solid state and nuclear physics. Laboratory included. Prerequisite: MTH 221. Offered fall.
- PHY 301. CLASSICAL MECHANICS AND DYNAMICAL SYSTEMS** 4 sh
In this introduction to Lagrangian and Hamiltonian treatments of classical mechanics, students explore variational principles, conservation laws, contemporary approaches to dynamical systems and topics in chaos theory. Laboratory included. Prerequisite: PHY 114. Offered fall of alternate years.
- PHY 302. STATISTICAL MECHANICS AND THERMODYNAMICS** 4 sh
This study covers statistical methods, the concept of the ensemble and statistical averages,

and explores thermodynamics using a theoretical progression from statistical analysis to thermodynamic variables. In-depth studies include conservation laws and thermodynamic variables such as entropy and free energy. Laboratory included. Prerequisite: PHY 301.

PHY 305. STELLAR ASTRONOMY

4 sh

Stellar astronomy involves study of the universe beyond the solar system, including stars, clusters, stellar evolution, variable stars, the Milky Way and other galaxies, quasars and cosmological models. Satisfies non-laboratory General Studies requirement. No credit for Physics major or minor. Prerequisite: MTH 100 or higher. Offered winter.

PHY 310. ENGINEERING THERMODYNAMICS

4 sh

Introduction to the concept of energy and the laws governing the transfers and transformations of energy. Emphasis on thermodynamic properties and First and Second Law analysis of systems and control volumes. Integration of these concepts into the analysis of basic power cycles is introduced. Prerequisites: MTH 321 and PHY 114.

PHY 311. CLASSICAL ELECTRODYNAMICS

4 sh

Classical electrodynamics involves the study of electrostatics (including image methods and electric fields in the presence of dielectric media), vector analysis, continuity conditions for field quantities at interfaces, and magnetism and magnetostatics. Laboratory included. Prerequisite: PHY 213. Offered fall.

PHY 312. ELECTRICITY, MAGNETISM AND FIELD THEORY

4 sh

This course includes Maxwell's equations and continuation of electrodynamics and explores the natural connection of field theory and electrodynamics and basic mathematical tools, including tensor analysis. By experiments and numerical simulation, students investigate electromagnetic radiation and fields. Laboratory included. Prerequisite: PHY 311. Offered spring of alternate years.

PHY 397- 398. PHYSICS LAB/SEMINAR

2 sh each

The Junior Lab/Seminar is a two-semester course in laboratory techniques at an advanced level designed for Physics and Engineering Physics majors. It will include instruction in the use of research equipment such as AFM, STM, NMR, high vacuum, LEED, Auger Spectrometer, UV/VIS Spectrophotometer, cryogenics and lock-in amplifiers. Introduction to journal research, a focused research project and a seminar presentation of results will be required. Offered fall and spring.

PHY 411. QUANTUM MECHANICS

4 sh

Study of quantum mechanics includes basic mathematical underpinnings of quantum formalisms and treats several basic problems including Hydrogen-like atoms and lasers in depth. Laboratory included. Prerequisite: PHY 301. Offered spring of alternate years.

PHY 412. RELATIVITY AND COSMOLOGY

4 sh

This course begins by examining fundamentally electro-dynamical problems out of which special relativity was born. Students read Einstein's original paper and study the classical paradoxes in depth. Discussion of cosmological problems includes black holes, galactic red shift and early universe theory. Some aspects of the general theory of relativity are also introduced. Prerequisites: PHY 311 and 312.

PHY 471. SPECIAL TOPICS IN PHYSICS

4 sh

These contemporary topics include, but are not limited to, chaos theory and nonlinear dynamics, solid state and condensed matter physics, optics, advanced quantum mechanics and particle physics. Prerequisite: permission of the instructor.

PHY 499. RESEARCH

1 sh

This semester-long supervised research project involves experimental, numerical or theoretical investigation of a single problem, culminating in a detailed report describing the methods, results and analysis performed including a publication style abstract of the research. Senior majors only. Offered fall, winter and spring.

Political Science

Chair, Department of Political Science and Public Administration: Professor C. Brumbaugh

Professors: Roselle, Taylor, Zarzar

Associate Professors: R. Anderson, Morgan, Spray

Assistant Professors: Sorensen, Vercellotti

Adjuncts: Beckman, Ciriano, Colbert, Harviel, Lambeth, Lewis, Simmons, Sink

Political Science seeks to understand the ideas, individuals and institutions engaged in making public policies that influence the lives of people in communities ranging from local to global. Courses investigate current issues and opinions, the process by which voters or leaders make decisions, the behavior of organized groups and governmental agencies, the relationships between nations and classic questions of how societies balance freedom, social justice, order and efficiency.

Students in this discipline are encouraged to develop critical reading, writing and research skills (often using computer programs); participate in role-playing simulations of local governments, legislatures, the United Nations and international relations; work as interns at the local and state level in government agencies, election campaigns and law firms; and spend a semester in Washington, D.C., working in executive and judicial agencies, the U.S. Congress, interest groups and international organizations.

The department offers majors in Political Science and Public Administration as well as minors in these fields. Students can concentrate their coursework in one or more subfields: American government, international relations, comparative politics, public administration, law and political theory. These programs help prepare students to enter graduate and law school, and pursue a wide range of careers in legislative, executive and judicial agencies; business; teaching; journalism; interest group advocacy; campaign management and international public service.

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A major in Political Science requires the following courses:

POL 111	American Government	4 sh
POL 220	Research Methods in Political Science	4 sh
POL 461	Senior Seminar in Political Science	4 sh
One course chosen from the following:		4 sh
POL 141	International Relations	
POL 261	Comparative Politics	
One course selected from the following:		4 sh
POL 300	Introduction to Political Thought	
POL 303	Democratic Theory	
POL 304	Theorists of Non-Violence	
Twenty-four additional hours in Political Science		24 sh
TOTAL		44 sh

It is strongly recommended that Political Science majors, in consultation with their advisors, select a subfield or topical concentration of at least 12 semester hours at the 300-level and above. Subfield and concentration courses will be chosen from among the 24 elective hours. With the approval of the student's advisor, up to four hours from outside the Political Science and Public Administration department may be applied toward the concentration. No more than eight internship hours may be applied to the major.

A minor in Political Science requires the following:

POL 111	American Government	4 sh
Sixteen semester hours in Political Science		16 sh
TOTAL		20 sh

POL 111. AMERICAN GOVERNMENT 4 sh

American Government serves as an introduction to the national political system including the legislative, executive and judicial branches; the Constitution; political parties; interest groups; public opinion and public policy issues. Offered fall and spring.

POL 112. NORTH CAROLINA STUDENT LEGISLATURE 1 sh

This is an experiential course which promotes active participation in the NCSL, debate of public issues and organizational involvement at the university and state-wide level. Offered fall and spring.

POL 114. MODEL UNITED NATIONS 1 sh

Through experiential learning activities, students gain insight into the workings of the United Nations, diplomacy and international politics. Offered fall and spring.

POL 116. LOCAL GOVERNMENT SIMULATION 4 sh

This course examines the structure and functioning of local governments and applies that understanding in a simulation of local government issues in which students assume the roles of city council members, planning commission members, organizational leaders, business owners, citizen groups and the media. Offered winter.

POL 141. INTERNATIONAL RELATIONS 4 sh

This course gives students a basic appreciation for our world and examines political issues such as the role of power and international law in the international system and economic, social and cultural features of the world. Offered fall and spring.

POL 220. RESEARCH METHODS IN POLITICAL SCIENCE 4 sh

This course introduces methodologies used in political science research. It focuses on concept formation, research design for problem solving and the measurement of data and data analysis. Political Science and Public Administration majors should take this course in their sophomore year. Offered fall and spring.

POL 222. STATE AND LOCAL GOVERNMENT AND POLITICS 4 sh

This course focuses on the structure and functioning of the state and local government and their roles within the American federal system. Offered fall and spring.

POL 224. ENVIRONMENTAL POLICY AND LAW 4 sh

This course focuses on the policy processes and institutional settings for environmental policy formation and governmental action. It deals with the role of the courts, Congress and federal agencies in the development, implementation and evaluation of environmental policy. Offered spring.

POL 231. PUBLIC ADMINISTRATION 4 sh

This course introduces the student to the complexities of administering government activities and emphasizes the basic principles of organizations, decision making, fiscal management, personnel management and other forms of action in the public sector. (Cross-listed with PUB 231.) Offered fall and spring.

POL 261. COMPARATIVE POLITICS 4 sh

This introduction to the central concepts of comparative politics and to the major types of contemporary political systems may include Britain, Germany, Japan, Nigeria, China, Mexico and the post-Soviet independent states of Eurasia. Offered spring.

- POL 300. INTRODUCTION TO POLITICAL THOUGHT** **4 sh**
 In a critical introduction to the great political thinkers, discussion spans from Plato to Rousseau. Offered every third semester.
- POL 303. DEMOCRATIC THEORY** **4 sh**
 This course examines conceptions, models and themes of democracy around the world using a comparative approach with special emphasis on models of democracy as they developed in the U.S. Offered every third semester.
- POL 304. THEORISTS OF NON-VIOLENCE** **4 sh**
 Non-violent alternatives to violence in resolving interpersonal and intergroup conflicts will be explored in light of the various Eastern and Western moral and religious traditions and the thought of such thinkers as Mahatma Gandhi, Martin Luther King, Jr. and others. Offered every third semester.
- POL 321. PUBLIC OPINION POLLING** **4 sh**
 The goal of this course is for students to learn how to supervise a public opinion poll and apply survey research theory to the Elon Poll. Students participate as interviewers in several polls and learn survey design, computer programming, analysis of poll data and how to write about survey results. Offered fall.
- POL 322. NORTH CAROLINA POLITICS AND POLICY** **4 sh**
 This course examines North Carolina's politics and public policy development from a broad historical perspective, analyzes how state government formulates and administers legislation and explores contemporary policy issues facing the state.
- POL 323. CONSTITUTIONAL LAW** **2 sh**
 Using a case study approach, this course focuses on American Constitutional structures: separation of powers, judicial review and federalism.
- POL 324. CIVIL LIBERTIES** **2 sh**
 The focus of this course is on individual rights guaranteed by the Bill of Rights.
- POL 325. THE PRESIDENCY** **4 sh**
 A study of the contemporary presidency emphasizing the organization of the office, its relationship to other structures in American politics and its role in the policy-making process. Offered every other year.
- POL 326. THE CONGRESS** **4 sh**
 Topics of study cover the policy-making process in Congress, focusing on party leadership, the committee system and the relationship between the Congress and the presidency, interest groups and the executive branch. Discussion also includes congressional reform proposals. Offered every other year.
- POL 328. PUBLIC POLICY** **4 sh**
 This study of public policy-making emphasizes policy content and focuses on the stages and options in the process, especially the complex relationships between the branches and levels of government within the structure of federalism. Students trace the development of selected public policy positions and focus on options available to contemporary decision makers. (Cross-listed with PUB 328.) Offered fall.
- POL 329. POLITICAL BEHAVIOR** **4 sh**
 This course focuses on political life from a micro-perspective by examining how political attitudes and behaviors are learned and how they affect our political choices, especially in regard to political socialization and electoral behavior. Offered every other year.
- POL 334. GIS APPLICATIONS FOR ADMINISTRATION AND PLANNING** **4 sh**
 Geographic Information Systems (GIS) is an indispensable tool in public policy research, analysis and implementation. Students will develop expertise in the use of GIS

software through the use of case studies, specific research projects and practical applications of this new technology in both the public and nonprofit sectors. (Cross-listed with PUB 334.) Offered every other year.

POL 335. ETHICS IN THE PUBLIC SECTOR **4 sh**

The course seeks to develop awareness of the responsibilities associated with discretionary power; to develop an understanding of the ethical standards, values and virtues associated with civil service; and to build skills in using moral imagination and ethical reasoning to assess and deal effectively with ethical dilemmas that arise in public service. (Cross-listed with PUB 335.) Offered fall.

POL 342. U.S. FOREIGN POLICY **4 sh**

This course covers the foreign relations, foreign policy process and international politics of the United States. Offered every other year.

POL 343. INTERNATIONAL LAW AND ORGANIZATIONS **4 sh**

This course focuses on the role of international law and organizations in determining patterns of international behavior with special attention to the United Nations. Offered every other year.

POL 344. INTERNATIONAL ENVIRONMENTAL POLICY **4 sh**

This course addresses environmental issues that cross national boundaries, such as global warming, natural resource scarcity, waste disposal and issues of international trade and the environment. It is useful for students of International Studies and Environmental Studies as well as Political Science.

POL 345. INTERNATIONAL TERRORISM **4 sh**

This course examines the genesis, typology and impact of international terrorism on nation states and the international community. It also explores the variety of approaches used, especially by the United States, to deal with international terrorism. Offered fall and spring.

POL 359. POLITICAL COMMUNICATIONS **4 sh**

This examination of political communications processes uses a comparative perspective and emphasizes the role of media in the U.S., Europe, Eurasia and developing countries.

POL 363. POLITICS OF ASIA **4 sh**

This exploration of the politics of Asia after World War II analyzes political and economic processes in the cases of Japan, China and newly industrializing countries.

POL 364. POLITICS OF EUROPE **4 sh**

This course explores the politics of Eastern and Western Europe since World War I.

POL 365. POLITICS OF EURASIA **4 sh**

This course analyzes the rise and fall of the Soviet Union as a political entity and studies the newly independent countries of the former Soviet Union in some depth.

POL 366. MIDDLE EAST POLITICS **4 sh**

This course studies Middle Eastern political dynamics and institutions, contemporary issues and problems of selected Middle Eastern and North African countries.

POL 367. POLITICS OF AFRICA **4 sh**

This course focuses on nation building and major factors influencing contemporary politics in selected African states. It emphasizes the legacy of colonialism/independence struggles, traditional loyalties, the political/social/economic origins of conflict/coalitions/coups, political participation, institutionalization/control, the destabilizing influences of class/ethnic/elitist/racial differences and African states in the world order.

- POL 368. LATIN AMERICAN POLITICS** **4 sh**
 Central America and Mexico receive emphasis in this study of the political dynamics, governmental structures and contemporary issues of selected countries of Latin America.
- POL 375. POLITICAL SCIENCE IN LONDON** **4 sh**
- POL 376. WASHINGTON CENTER SEMINAR** **1-4 sh**
 Students learn first hand from speakers, on-site visits and other experiential opportunities in Washington, D.C., and other locations through the Washington Center. Course requirements include readings, writing assignments and collaborative work dealing with a wide variety of topics. Prerequisite: permission of department. Offered every semester.
- POL 382. CAMPAIGN MANAGEMENT** **4 sh**
 This course provides a practical study of how to run an election campaign with attention to setting up, staffing and financing a campaign office, organizing events, media relations, campaign technology, polling, advertising and getting out the vote. Students spend significant time as an intern for a candidate of their choice and reflect on their experience. Offered fall of even-numbered years.
- POL 428. COMPARATIVE PUBLIC POLICY** **4 sh**
 Focusing primarily on various countries in Europe and Eurasia, with comparisons to the United States, this course examines the differences in the formation and implementation of a variety of public policies. It also explores differences in political culture, economic structure, political institutions and national approaches to domestic social policies and how those differences impact the policy process and policy content. (Cross-listed with PUB 428.) Offered every other year.
- POL 431. POLICY ANALYSIS AND PROGRAM EVALUATION** **4 sh**
 Two aspects of the public policy process are covered in this course. Policy analysis focuses on the formulation stage of the policy process and attempts to isolate both the intended and many unintended effects of public policy. Program evaluation determines the degree to which a program is meeting its objectives and considers problems and side effects. Prerequisite: POL 111 or permission of instructor. (Cross-listed with PUB 431.) Offered spring.
- POL 433. URBAN POLITICS** **4 sh**
 Advanced study in areas of the Urban Politics field centers on varying topics to be decided by the instructor. Selections might include urban management, urban public policy, urban problems, etc. Prerequisite: POL 222 or permission of instructor. (Cross-listed with PUB 433.)
- POL 461. SENIOR SEMINAR IN POLITICAL SCIENCE** **4 sh**
 The capstone experience for senior Political Science majors involves close review of the discipline's conceptual approaches to the study of political issues, discussion and development of research strategies. Students must also present a work of original scholarship. Prerequisite: senior majors only. Offered fall and spring.
- POL 481. INTERNSHIP IN POLITICAL SCIENCE** **1-16 sh**
 Work experience in a partisan, nonprofit, business, governmental or legal setting requires students to establish experiential goals and to reflect on the learning experience. Offered on an individual basis when suitable opportunities can be arranged.
- POL 485. WASHINGTON INTERNSHIP IN POLITICAL SCIENCE** **1-12 sh**
 Work experience in a partisan, nonprofit, business, governmental or legal setting in the Washington, D.C., area, requires students to establish experiential goals and reflect on the learning experience. Offered on an individual basis when suitable opportunities can be arranged.

POL 491. INDEPENDENT STUDY **1-4 sh**

POL 492. TOPICS IN POLITICAL SCIENCE **4 sh**

This advanced course explores significant contemporary issues or developments within the discipline. Prerequisite: POL 111 or permission of the instructor.

POL 499. RESEARCH **1-4 sh**

This course is an opportunity for students to undertake an empirical or theoretical study of a topic in Political Science in collaboration with a departmental faculty member. Research projects may include a review of research literature, developing a research design, data collection and analysis, and a presentation or report when the study is completed. Prerequisite: permission of instructor. A research proposal form completed by the student in conjunction with the faculty member is required for registration. Students may register for one-four hours of credit per semester and may register for more than one semester of research for a total of eight hours of research credit toward the major. Students must have a minimum 2.5 GPA and have completed 28 semester hours of undergraduate work.

Professional Writing Studies

Coordinator: Lecturer Strickland, Director of Writing Across the Curriculum*

Professional Writing Studies is an interdisciplinary minor designed for students across the disciplines who would like to add to their majors focused study and practice in applied writing. This minor is intended not only to strengthen the writing instruction offered to students across the disciplines, but also to responsibly prepare students for the steadily increasing numbers of specialized professional, technical and medical writing positions in government agencies, industry and nonprofit organizations.

The minor is broad and flexible enough that students can formulate course sequences appealing to their specific interests. It is also structured tightly enough to effectively guide students' curricular decisions.

A required introductory course prepares students to see writing broadly as a complex, highly situated form of social action and production. Three required practice courses engage students in hands-on projects where they learn to apply advanced practical writing skills within specific contexts. Finally a variety of internship experiences are possible in which students have a chance to practice what they have learned in actual disciplinary or professional contexts.

The minor requires a minimum of 20 semester hours. Practice/applied courses must be chosen from at least two disciplines.

A minor in Professional Writing Studies requires the following:

ENG 204	Survey of Professional Writing and Rhetoric	4 sh
Twelve semester hours chosen from the following practice/applied courses; courses must be chosen from at least two disciplines:		12 sh
ART 263	Digital Art I	
ART 363	Digital Art II	
BUS 202	Business Communications	
ENG 211	Style and Editing	
ENG 212	Writing, Rhetoric and Interface Design	
ENG 219	Writing Studies Survey	

ENG 304	Understanding Rhetoric	
ENG 311	Document Research, Management and Production	
ENG 312	Visual Rhetoric and Document Design	
ENG 318	Technical and Scientific Writing	
ENG 319	Writing Center Workshop	
ENG 397	Writing as Inquiry	
ENG 411	Advanced Topics in Professional Writing and Rhetoric	
HUS 412	Professional Communication	
JCM 304	Public Relations and Corporate Citizenship	
JCM 327	Corporate Publishing and Writing	
JCM 338	Magazine Publishing	
JCM 364	Web Publishing and Design	
Four semester hours from one disciplinary internship course		4 sh
(The course must be carefully designed as a professional writing internship and approved by the Director of Writing Across the Curriculum. Most ENG 381 or 481 courses can be designed for this purpose and approved.)		
TOTAL		20 sh

*Note: The minor is jointly administered by the English department and the Interdisciplinary Writing Committee, chaired by the director of Writing Across the Curriculum, who also serves as the minor's coordinator. All questions should be referred to the coordinator.

Psychology

Chair, Department of Psychology: Associate Professor King

Professors: Granowsky, Green

Associate Professors: Fromson, Levesque, McClearn, Pickens, Smith, Vandermaas-Peeler

Assistant Professors: Gendle, Leupold

The psychology major at Elon University presents the principles, methods and research findings of the field of psychology. Students in the major learn and practice sound research methods and are given many opportunities for exploring the breadth of the content areas in psychology. In each psychology course, students are involved in writing and speaking in the discipline. Interested students may engage in a variety of applied internship experiences and/or collaborative research with departmental faculty.

Students with a bachelor's degree in psychology have many career options. Some students enter fields such as law enforcement, court counseling, daycare, group home counseling, YMCA program work, personnel and entry level positions in mental health. Others opt to go on to graduate school in a variety of programs including clinical, counseling or school psychology, social work, special education, law and many others. Psychology majors receive both a liberal arts education and practice in the skills of research, professional writing and speaking and are therefore prepared for a variety of careers.

A major in Psychology requires the following courses:

PSY 111	General Psychology	4 sh
PSY 201	Research Methods and Statistics in Psychology	4 sh
PSY 301	Empirical Research	4 sh
PSY 461	Senior Seminar	4 sh

Two courses chosen from the following:	8 sh
PSY 212 Learning and Memory	
PSY 221 Biological Bases of Behavior	
PSY 233 Lifespan Human Development	
Two courses chosen from the following:	8 sh
PSY 312 Cognitive Psychology	
PSY 323 Social Psychology	
PSY 343 Psychology of Personality and Individual Differences	
Twelve additional semester hours in Psychology	12 sh
TOTAL	44 sh

A minor in Psychology requires the following courses:

PSY 111 General Psychology	4 sh
One course from the following:	4 sh
PSY 212 Learning and Memory	
PSY 221 Biological Bases of Behavior	
PSY 233 Lifespan Human Development	
One course from the following:	4 sh
PSY 321 Educational Psychology	
PSY 333 Abnormal Behavior	
PSY 356 Health Psychology	
PSY 363 Industrial and Organizational Psychology	
Eight semester hours from Psychology courses	8 sh
TOTAL	20 sh

PSY 111. GENERAL PSYCHOLOGY **4 sh**

General psychology surveys central topics in the field, including research methodology, learning and memory processes, social psychology, psychological disorders and personality. Offered fall and spring.

PSY 201. RESEARCH METHODS AND STATISTICS IN PSYCHOLOGY **4 sh**

Students learn how to design, review and analyze psychological research. The course focuses on developing research questions, answering them using research designs and complementary data analysis techniques, and the basics of writing research reports. Prerequisites: PSY 111; MTH 112; psychology major status. Offered fall and spring.

PSY 212. LEARNING AND MEMORY **4 sh**

This course addresses models of knowledge acquisition (including classical and operant conditioning and cognitive processes), encoding and storage of information, memory retrieval and forgetting. Prerequisite: PSY 111. Offered fall or spring.

PSY 215. THE PSYCHOLOGY OF PERSONAL RELATIONSHIPS **4 sh**

The purpose of this course is to investigate personal relationships from various viewpoints of psychology (e.g., social, cognitive and biopsychological). Interactions with family members and friends will be discussed, but the emphasis will be placed on the initiation, maintenance and termination of romantic relationships.

PSY 221. BIOLOGICAL BASES OF BEHAVIOR **4 sh**

This course explores the biological foundations of such psychological processes as learning and memory, movement, sleep and emotions, as well as such abnormal conditions as schizophrenia and depression. Prerequisite: PSY 111. Offered fall or spring.

- PSY 225. MENTAL ILLNESS AND FILM** **4 sh**
 Hollywood depictions of mental illness have contributed significantly to the ideas and images many individuals hold about mental illness. Students will look at some of the major types of mental illnesses (e.g., depression, sexual disorders, schizophrenia, antisocial personality disorder) and examine how they have been portrayed, for better and worse, in popular films.
- PSY 233. LIFESPAN HUMAN DEVELOPMENT** **4 sh**
 An exploration of human development across the entire lifespan includes consideration of cognitive, social and emotional development as a complex interaction between individuals and their social and cultural environments. Prerequisite: PSY 111. Offered fall or spring.
- PSY 301. EMPIRICAL RESEARCH** **4 sh**
 Students become familiar with the major theoretical and empirical foundations of one topic area of psychology (e.g., interpersonal attraction, memory processes, cognitive development, health psychology, organizational performance). Working in research teams under faculty direction, students devise, implement and report an original empirical investigation of a question related to the selected area of concern. Prerequisites: PSY 201; psychology major status. Offered fall and spring.
- PSY 312. COGNITIVE PSYCHOLOGY** **4 sh**
 Cognitive psychology studies how humans represent and process information about the environment in their role as thinkers, planners, language users and problem solvers. Prerequisites: PSY 111, 201. Offered fall or spring.
- PSY 315. PSYCHOLOGY OF SEX AND GENDER** **4 sh**
 This course focuses on the psychology of sex and gender from a feminist perspective and is organized around four themes: gender as a social construction, the importance of language and the power to name, class and cultural diversity, and knowledge as a source of social change.
- PSY 321. EDUCATIONAL PSYCHOLOGY** **4 sh**
 Students gain an overview of research and theory in educational psychology and explore their applications in teaching and learning. Prerequisite: PSY 111 or EDU 211. Offered fall and spring.
- PSY 323. SOCIAL PSYCHOLOGY** **4 sh**
 Topics in social psychology explore how people think about, influence and relate to one another including affiliation, aggression, altruism, attitude formation and change, attribution, compliance, conformity and persuasion. Prerequisites: PSY 111, 201. Offered fall or spring.
- PSY 325. THE PSYCHOLOGY OF AMERICAN PROTEST MUSIC** **4 sh**
 This course is a study of the psychological impact of music used to promote social change. By necessity, this study utilizes a variety of perspectives in addition to psychological ones, including historical, socio-political and musicological. Movements covered include early labor organizations, civil rights and antiwar. Prerequisite: PSY 111.
- PSY 327. THE PSYCHOLOGY OF NONVIOLENCE** **4 sh**
 This course is a study of the variety of means for resolving conflict, with a focus on nonviolent alternatives. Our emphasis is on the psychological impact of conflict and the means of its resolution. Topics include the impact of fear in conflict situations, psychological obstacles to resolution, Gandhian philosophy and the education of children in conflict resolution. Prerequisite: PSY 111 or permission of instructor.
- PSY 331. PSYCHOLOGICAL TESTING** **4 sh**
 This course addresses issues connected with measuring psychological constructs such as intelligence, personality and vocational interest. Among these are the variety of tech-

niques for assessing people's characteristics, attitudes and performance in reliable and valid ways and how this information gets used in making decisions about people's lives. In addition to basic assessment principles, first-hand experience with several psychological tests will be provided. Prerequisites: PSY 111, and one of the following: PSY 201, ECO 202, MTH 112, MTH 210, HUS 285, POL 220, SOC 216.

PSY 332. PSYCHOLOGY OF EXCEPTIONALITY

4 sh

Students learn the measures and procedures used to evaluate exceptional children and techniques for educational intervention and remediation as they study the origins, symptoms and characteristics of exceptional children. Study covers those children who are emotionally, physically or mentally disabled, as well as those who are gifted and talented. Prerequisite: PSY 111.

PSY 333. ABNORMAL BEHAVIOR

4 sh

In this overview of major psychological disturbances (anxiety, mood, personality, sexual and schizophrenic disorders), students examine the role of different theories, diagnostic tests and procedures in understanding illness and learn the basics of therapeutic interventions. Prerequisite: PSY 111.

PSY 343. PSYCHOLOGY OF PERSONALITY AND INDIVIDUAL DIFFERENCES

4 sh

This course covers major modern perspectives in personality psychology including dispositional, biological, psychodynamic, self and social-cognitive theories. Students are also introduced to issues and techniques of personality testing and assessment. Prerequisites: PSY 111, 201. Offered fall or spring.

PSY 355. HUMAN PERCEPTION

4 sh

Study in human perception includes research and theory on the structural and functional characteristics of various perceptual systems, on perceptual phenomena such as depth and color perception and on other related topics. Prerequisite: PSY 111.

PSY 356. HEALTH PSYCHOLOGY

4 sh

This course focuses upon the role of psychology in a variety of medical issues: health-enhancing and health-compromising behaviors, stress and illness, patient-practitioner relationships, pain and other chronic conditions. The growing field of health psychology is explored as both an area of research and a clinical profession. Prerequisite: PSY 111.

PSY 357. CRIMINAL BEHAVIOR

4 sh

This course focuses primarily on the causes of crime, the criminal mind and the resulting social and personal costs of crime. Also addressed are various aspects of the criminal justice system, including the relevance of psychology to courtroom proceedings. Although many types of crime are explored, emphasis is placed on violent crime.

PSY 361. ANIMAL BEHAVIOR

4 sh

An investigation of animal behavior takes into account physiology, development, evolution and adaptation. Studies emphasize specialized structures and abilities which may or may not be present in humans and which confer selective advantages upon their possessors. Prerequisite: PSY 111.

PSY 363. INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY

4 sh

Psychological applications in the workplace are the focus of this course. Topics include personnel selection, leadership and motivation, job satisfaction and work performance. Prerequisite: PSY 111.

PSY 366. PSYCHOLOGY IN CULTURAL CONTEXT

4 sh

Issues in the related fields of cultural and cross-cultural psychology are considered in depth as students investigate basic psychological processes (e.g., motivation, cognition and emotion) in the context of how cultural world views and implicit value assumptions influence the development and functioning of human behavior and social interaction. Prerequisite: PSY 111.

PSY 371. SPECIAL TOPICS IN PSYCHOLOGY **4 sh**

PSY 461. SENIOR SEMINAR **4 sh**

In this capstone course, students will read primary sources (i.e., original articles) and identify and critically evaluate theoretical issues and empirical findings in the field. With faculty supervision, students will develop and present (in both written and oral formats) a thesis-level integrative literature review manuscript. Prerequisites: PSY 301 and senior status in the major. Offered fall and spring.

PSY 481. INTERNSHIP IN PSYCHOLOGY **1-4 sh**

Upper-level majors apply psychological theories and techniques to actual experiences in the field. Maximum four semester hours toward major. Prerequisite: majors with faculty approval.

PSY 491. INDEPENDENT STUDY **1-4 sh**

Prerequisites: junior/senior status and permission of the instructor.

PSY 499. RESEARCH **1-4 sh**

In collaboration with a psychology faculty member, students undertake an empirical or theoretical study of a topic in psychology. Research projects may include a review of the relevant research literature, data collection and analysis, and a presentation or report when the study is completed. Prerequisites: PSY 111, 201 and permission of instructor. A completed research proposal form completed by the student in conjunction with the faculty member is required for registration. Students may register for one to four hours of credit per semester and may register for more than one semester of research for a total of eight hours of research credit toward the major. Offered fall, winter and spring.

Public Administration

Chair, Department of Political Science and Public Administration: Professor C. Brumbaugh

Professors: Roselle, Taylor, Zarzar

Associate Professors: Anderson, Morgan, Spray

Assistant Professors: Sorensen, Vercellotti

Adjuncts: Colbert, Lewis

The Public Administration major prepares students interested in pursuing graduate education and careers in governmental or nonprofit service agencies. Courses in the major include the study of the management functions in public agencies, governmental structures and processes, techniques used in the evaluation process and a variety of public policies. Field experiences including internships and course-linked service learning are emphasized within the major. Students develop technical competencies and theoretical understandings from courses relevant to public administration and from other disciplines as well.

A major in Public Administration requires the following courses:

PUB 231	Public Administration	4 sh
PUB 328	Public Policy	4 sh
PUB 335	Ethics in the Public Sector	4 sh
PUB 431	Policy Analysis and Program Evaluation	4 sh
PUB 461	Seminar in Public Administration	4 sh
POL 111	American Government	4 sh
POL 220	Research Methods in Political Science	4 sh
POL 222	State and Local Government and Politics	4 sh

Twelve hours selected from the following courses:	12 sh
ACC 201 Principles of Financial Accounting	
BUS 303 Introduction to Managing	
ECO 201 Principles of Economics	
POL 325 The Presidency	
POL 326 The Congress	
POL 382 Campaign Management	
PUB 334 GIS Applications for Administration and Planning	
PUB 428 Comparative Public Policy	
PUB 433 Urban Politics	
Any Public Administration course	4 sh
TOTAL	48 sh

It is strongly recommended that Public Administration majors, in consultation with their advisors, select a topical concentration of at least 12 semester hours at the 300-level and above. Concentration courses will be chosen from among the 16 elective hours. With the approval of the student's advisor, up to four hours from outside the Political Science and Public Administration department may be applied toward the concentration. No more than eight internship hours may be applied to the major. Students considering graduate school in Public Administration should take additional courses in Accounting, Economics and Business Administration.

A minor in Public Administration requires the following courses:

POL 111 American Government	4 sh
PUB 231 Public Administration	4 sh
Twelve semester hours in Public Administration courses	12 sh
TOTAL	20 sh

PUB 231. PUBLIC ADMINISTRATION 4 sh

This course introduces the student to the complexities of administering government activities and emphasizes the basic principles of organizations, decision making, fiscal management, personnel management and other forms of action in the public sector. Offered fall and spring.

PUB 328. PUBLIC POLICY 4 sh

This study of public policy making emphasizes policy content and focuses on the stages and options in the process, especially the complex relationships between the branches and levels of government within the structure of federalism. Students trace the development of selected public policy positions and focus on options available to contemporary decision makers. Offered fall.

PUB 334. GIS APPLICATIONS FOR ADMINISTRATION AND PLANNING 4 sh

Geographic Information Systems (GIS) is an indispensable tool in public policy research, analysis and implementation. Students will develop expertise in the use of GIS software through the use of case studies, specific research projects and practical applications of this new technology in both the public and nonprofit sectors. Offered every other year.

PUB 335. ETHICS IN THE PUBLIC SECTOR 4 sh

The course seeks to develop awareness of the responsibilities associated with discretionary power; to develop an understanding of the ethical standards, values and virtues associated with civil service; and to build skills in using moral imagination and ethical reasoning to assess and deal effectively with ethical dilemmas that arise in public service. Offered fall.

PUB 428. COMPARATIVE PUBLIC POLICY**4 sh**

Focusing primarily on various countries in Europe and Eurasia, with comparisons to the United States, this course examines the differences in the formation and implementation of a variety of public policies. It also explores differences in political culture, economic structure, political institutions and national approaches to domestic social policies, and how those differences impact the policy process and policy content. Offered every other year.

PUB 431. POLICY ANALYSIS AND PROGRAM EVALUATION**4 sh**

Two aspects of the public policy process are covered in this course. Policy analysis focuses on the formulation stage of the policy process and attempts to isolate both the intended and many unintended effects of public policy. Program evaluation determines the degree to which a program is meeting its objectives and considers problems and side effects. Prerequisite: POL 220 or permission of instructor. Offered spring.

PUB 433. URBAN POLITICS**4 sh**

Advanced study in areas of the urban politics field centers on varying topics to be decided by the instructor. Selections might include urban management, urban public policy, urban problems, etc. Prerequisite: POL 222 or permission of instructor.

PUB 461. SEMINAR IN PUBLIC ADMINISTRATION**4 sh**

The capstone experience for senior Public Administration majors involves review of the discipline's conceptual approaches and discussion and development of research strategies. Students must present a work of original scholarship. Prerequisite: senior majors only. Offered fall.

PUB 481. INTERNSHIP IN PUBLIC ADMINISTRATION**1-16 sh**

Work experience in a nonprofit, business, governmental or legal setting requires students to establish experiential goals and to reflect on the learning experience. Offered on an individual basis when suitable opportunities can be arranged.

PUB 485. WASHINGTON INTERNSHIP IN PUBLIC ADMINISTRATION**1-12 sh**

Work experience in a partisan, nonprofit, business, governmental or legal setting in the Washington, D.C. area, requires students to establish experiential goals and reflect on the learning experience. Offered on an individual basis when suitable opportunities can be arranged.

PUB 491. INDEPENDENT STUDY**1-4 sh****PUB 499. RESEARCH****1-4 sh**

This course is an opportunity for students to undertake an empirical or theoretical study of a topic in public administration in collaboration with a departmental faculty member. Research projects may include a review of research literature, developing a research design, data collection and analysis, and a presentation or report when the study is completed. Prerequisite: permission of instructor. A research proposal form completed by the student in conjunction with the faculty member is required for registration. Students may register for one to four hours of credit per semester and may register for more than one semester of research for a total of eight hours of research credit toward the major. Students must have a minimum 2.5 GPA and have completed 28 semester hours of undergraduate work.