
MATHEMATICAL SCIENCES

www.bsu.edu/math

Robert P. Bell Building 465, (765) 285-8640

Chairperson: Dale E. Umbach

Graduate Advisor in Mathematical Statistics: Mir M. Ali

Graduate Advisor in Actuarial Science: William B. Frye

Graduate Advisor in Mathematics: Roger B. Nelson

Graduate Advisor in Mathematics Education: Sheryl Stump

Graduate Faculty: Ali, Baglama, E. Bremigan, R. Bremigan, Dean, Emert, Fischer, Foley, Frye, K. Jones, Karls, Leitze, Lorch, Mohammed, Okten, Pierce, Roebuck, Stankewitz, Stump, Toda, Umbach, Whitaker

PROGRAMS

Master of arts (M.A.) in actuarial science, in mathematics, in mathematics education, and in statistics; master of science (M.S.) in mathematics

See the Science listing under the College of Sciences and Humanities, page 148, for the doctoral programs in science and science education.

MASTER OF ARTS IN ACTUARIAL SCIENCE

The master's program in actuarial science provides training for careers that involve analyzing and solving financial, business, and social problems related to economic risk. The program includes course work that prepares students for the professional examinations given by the Society of Actuaries and the Casualty Actuary Society.

Admission

Applicants must meet admission requirements of the Graduate School. It is also expected that students will have had three semesters of calculus, a course in linear algebra, and at least one semester of probability and statistics.

Degree Requirements

| PREFIX | NO | SHORT TITLE | CR | HRS |
|--------|-----|--------------------|----|-----|
| MATHS | 551 | Math Finance | 4 | |
| | 552 | Life Cont 1 | 4 | |
| RMI | 597 | Indpen Study (1-6) | 3 | |
| MATHS | 620 | Math Stat 1 | 4 | |
| | 659 | Res Act Sci | 3 | |

15-16 hours from

| | | |
|-----------|------------------|-------|
| MATHS 528 | Reg Time Ser (3) | |
| 553 | Life Cont 2 (4) | |
| 557 | Loss Distrib (4) | |
| 621 | Math Stat 2 (4) | |
| 655 | Top Act Sci (4) | |
| 657 | Survival Mod (4) | |
| 658 | Risk Theory (4) | 15-16 |

Electives

(To be taken if required courses are waived because of undergraduate credit)

| | | |
|-----------|-------------------|--|
| MATHS 555 | Prob in Act (2) | |
| 558 | Pract Act (2) | |
| 625 | Prob Theory 1 (3) | |
| 626 | Prob Theory2 (3) | |

33-34 hrs

MASTER OF ARTS IN MATHEMATICS

The master of arts degree in mathematics provides students with a broad graduate level mathematical background suitable for pursuing a Ph.D. degree in the mathematical sciences or for seeking employment in business, industry, or government.

Admission

Applicants must meet the regular admission requirements of the Graduate School and have an undergraduate major in mathematics or an equivalent background as determined by the Department of Mathematical Sciences.

Degree Requirements

| PREFIX NO | SHORT TITLE | CR HRS |
|--|--------------------|--------|
| MATHS 511 | Abstr Alg 1 | 3 |
| 512 | Abstr Alg 2 | 3 |
| (If the undergraduate equivalent is not completed. Otherwise select from the following to complete at least 6 semester hours.) | | |
| MATHS 516 | Thry Numbers (3) | |
| 619 | Spec Stu Alg (1-8) | |
| 6 hours from | | |
| MATHS 571 | Real Anls 1 (3) | |
| 572 | Real Anls 2 (3) | |
| 675 | Real Varbl 1 (3) | |
| 676 | Real Varbl 2 (3) | |
| 677 | Complex Var 1 (3) | |
| 678 | Complex Var 2 (3) | 6 |
| 6-8 hours from | | |
| MATHS 562 | Numer Anls 1 (3) | |
| 563 | Numer Anls 2 (3) | |
| 620 | Math Stat 1 (4) | |
| 621 | Math Stat 2 (4) | |
| 625 | Prob Theor 1 (3) | |
| 626 | Prob Theor 2 (3) | |
| 645 | Topology 1 (3) | |
| 646 | Topology 2 (3) | 6-8 |
| Research component, 3-6 hours from | | |
| MATHS 689 | Res Mth Stat (3) | |
| 698 | Res Math Ed (3) | |
| THES 698 | Thesis (1-6) | 3-6 |
| Electives as directed by advisor | | |
| | | 4-9 |
| | | 30 hrs |

MASTER OF ARTS IN MATHEMATICS EDUCATION

The master's program in mathematics education provides elementary, middle school, and high school mathematics teachers with opportunities to develop significant mathematical, pedagogical, and technological knowledge related to the teaching and learning of mathematics.

Option 1: Elementary and middle school mathematics

Admission

Applicants must meet the regular admission requirements of the Graduate School; hold a current elementary, middle school, or special education teaching license; and have at least one year of elementary or middle school teaching experience.

512 Abstract Algebra 2. (3) An introduction to the theory of rings, including integral domains, division rings, and fields. Quotient fields of integral domains. Homomorphisms, ideals, and quotient structures. Factorization in commutative rings.

Degree Requirements

| PREFIX NO | SHORT TITLE | CR HRS |
|----------------------------------|--------------|--------|
| Professional education, 15 hours | | |
| MATHS 631 | Tech Mth Tch | 3 |
| 632 | Assmt Mth Ed | 3 |
| 693 | Stds Tch JHM | 3 |
| 696 | Act Res Meth | 3 |
| 698 | Res Math Ed | 3 |
| Mathematics content, 15 hours | | |
| MATHS 617 | Alg Fns Tch | 3 |
| 618 | Nmbr Sys Tch | 3 |
| 644 | Geo Meas Tch | 3 |
| 671 | Cont Disc Tc | 3 |
| 681 | Data Anl Tch | 3 |
| | | 30 hrs |

Option 2: Secondary mathematics

Admission

Applicants must meet the regular admission requirements of the Graduate School; have an undergraduate major in mathematics or an equivalent background as determined by the Department of Mathematical Sciences; hold a current secondary mathematics teaching license; and have at least one year of secondary mathematics teaching experience.

Degree Requirements

| PREFIX NO | SHORT TITLE | CR HRS |
|--|--------------|--------|
| Professional education, 15 hours | | |
| MATHS 631 | Tech Mth Tch | 3 |
| 632 | Assmt Mth Ed | 3 |
| 695 | Stds Tch Sec | 3 |
| 696 | Act Res Meth | 3 |
| 698 | Res Math Ed | 3 |
| Mathematics content, 15 hours | | |
| MATHS 641 | Topics Geom | 3 |
| Take each of the following unless the undergraduate equivalent is completed. | | |
| MATHS 511 | Abstr Alg 1 | 3 |
| 516 | Thry Numbers | 3 |
| 571 | Real Anls 1 | 3 |

3-12 hours from
Mathematical Sciences 197
 (If undergraduate equivalent is not completed.)

MATHS 512 Abstr Alg 2 (3) squares, factorial, $n!$, binomial coefficients, incomplete block designs, Analysis of covariance; confounding and multiple comparison tests. 572 Real Anls 2 (3) Prerequisite: MATHS 571 or an equivalent. 621 Math Stat 2 (4) *Not open to students who have credit in MATHS 429.* 626 Prob Theor 2 (3)

551 Mathematics of Finance. (4) Mathematical theory of compound interest, force of interest, annuities, equations of value, yield rated,

| | | |
|-----|------------------|--------|
| 645 | Topology 1 (3) | |
| 675 | Real Varbl 1 (3) | |
| 677 | Complx Var 1 (3) | 3-12 |
| | | 30 hrs |

MASTER OF ARTS IN STATISTICS

The master's program in statistics provides students with the background suitable for employment as a statistician in business, industry, or government. The degree also provides suitable preparation for pursuing a Ph.D. degree in statistics.

Admission

Applicants must meet admission requirements of the Graduate School. It is also expected that students will have had three semesters of calculus and a course in linear algebra.

Degree Requirements

| PREFIX | NO | SHORT TITLE | CR HRS |
|--------|-----|---------------|--------|
| MATHS | 522 | Sampling | 3 |
| | 528 | Reg Time Ser | 3 |
| | 529 | Exp Designs | 3 |
| | 620 | Math Stat 1 | 4 |
| | 621 | Math Stat 2 | 4 |
| | 625 | Prob Theory 1 | 3 |
| | 626 | Prob Theory 2 | 3 |
| | 628 | Monte Carlo | 4 |
| | 689 | Res Mth Stat | 3 |
| | | | 30 hrs |

MASTER OF SCIENCE IN MATHEMATICS

The master of science degree in mathematics provides students with a broad graduate level mathematical background suitable for pursuing a Ph.D. degree in the mathematical sciences or for seeking employment in business, industry, or government. Students pursuing the master of science degree will be required to write a 6-hour thesis.

Admission

Applicants must meet the regular admission requirements of the Graduate School and have an undergraduate major in mathematics or an equivalent background as determined by the Department of Mathematical Sciences.

Degree Requirements

| PREFIX | NO | SHORT TITLE | CR HRS |
|--------|-----|-------------|--------|
| MATHS | 511 | Abstr Alg 1 | 3 |
| | 512 | Abstr Alg 2 | 3 |

(If the undergraduate equivalent is not completed. Otherwise select from the following to complete at least 6 semester hours.)

| | | | |
|--------------------------------------|-----|--------------------|--------|
| MATHS | 516 | Thry Numbers (3) | |
| | 619 | Spec Stu Alg (1-8) | |
| 6 hours from | | | |
| MATHS | 571 | Real Anls 1 (3) | |
| | 572 | Real Anls 2 (3) | |
| | 675 | Real Varbl 1 (3) | |
| | 676 | Real Varbl 2 (3) | |
| | 677 | Complx Var 1 (3) | |
| | 678 | Complx Var 2 (3) | 6 |
| 6-8 hours from | | | |
| MATHS | 562 | Numer Anls 1 (3) | |
| | 563 | Numer Anls 2 (3) | |
| | 620 | Math Stat 1 (4) | |
| | 621 | Math Stat 2 (4) | |
| | 625 | Prob Theor 1 (3) | |
| | 626 | Prob Theor 2 (3) | |
| | 645 | Topology 1 (3) | |
| | 646 | Topology 2 (3) | 6-8 |
| THES | 698 | Thesis (1-6) | 6 |
| Electives as directed by the advisor | | | 4-6 |
| | | | 30 hrs |

Facilities

The Department of Mathematical Sciences is in the Robert P. Bell Building, with offices, conference and seminar rooms, and computer facilities. Among the advantages of the department's four programs are small class sizes that permit students to develop close working relationships with faculty and to interact frequently with their peers, opportunities to conduct studies under the direction of scholars well established in their specializations, and an excellent record of graduate placement.

Faculty involved with the programs are active in various state, national, and international professional organizations, possess extensive and varied work experience, and regularly publish their research works in national and international journals.

MATHEMATICAL SCIENCES (MATHS)

511 Abstract Algebra 1. (3) The theory of groups, including subgroups, cyclic groups, normal subgroups, cosets, Lagrange's Theorem, quotient structures, homomorphism, automorphisms, group actions, Sylow's Theorems, structure of finite abelian groups, generators, and relations.

Prerequisite: MATHS 311 or permission of the department chairperson.

Not open to students who have credit in MATHS 411.

512 Abstract Algebra 2. (3) An introduction to the theory of rings, including integral domains, division rings, and fields. Quotient fields of integral domains. Homomorphisms, ideals, and quotient structures. Factorization in commutative rings. Polynomial rings and field extensions. Aspects of Galois theory.

Prerequisite: MATHS 411 or 511 or permission of the department chairperson.

Not open to students who have credit in MATHS 412.

516 Theory of Numbers. (3) Topics include the division algorithm; positional notation; divisibility; primes; congruences; divisibility criteria; the sigma, divisor, and phi functions; Diophantine equations; linear, polynomial, and simultaneous congruences; theorems of Fermat, Euler, Lagrange, and Wilson; quadratic reciprocity.

Prerequisite: MATHS 215 or permission of the department chairperson.

Not open to students who have credit in MATHS 416.

522 Theory of Sampling and Surveys. (3) Survey designs; simple random, stratified, cluster, and systematic sampling; ration estimates; regression estimates; cost and variance functions.

Prerequisite: MATHS 321 or the equivalent.

528 Regression and Time Series Models. (3) Addresses regression topics that include simple and multiple linear regression, polynomial regression, regression diagnostics, and forecasting. Also introduces time series topics that include exponential smoothing, autoregressive, integrated, moving average (ARIMA) models, and forecasting.

Prerequisite: MATHS 321 or the equivalent.

Not open to students who have credit in MATHS 428.

529 Analysis of Variance in Experimental Design Models. (3) Multivariate normal distribution; quadratic forms; linear models; simple random, randomized block, Latin

squares, factorial, split-plot, balanced incomplete block designs; analysis of covariance; confounding; and multiple comparison tests.

Prerequisite: MATHS 321 or the equivalent.

Not open to students who have credit in MATHS 429.

551 Mathematics of Finance. (4) Mathematical theory of compound interest, force of interest, annuities, equations of value, yield rate, amortization, sinking funds, bonds, depreciation, and current topics of finance.

Prerequisite: MATHS 166.

Not open to students who have credit in MATHS 351.

552 Mathematics of Life Contingencies

1. (4) Survival distributions, life tables; the mathematics of life insurance, life annuities, net premiums, and net premium reserves.

Parallel: MATHS 551.

Not open to students who have credit in MATHS 452.

553 Mathematics of Life Contingencies

2. (4) The mathematics of multiple life functions, multiple decrement models, valuation theory for pension plans, insurance models including expenses, nonforfeiture benefits, and dividends.

Prerequisite: MATHS 552.

Not open to students who have credit in MATHS 453.

555 Problems in Actuarial Science. (2)

Limits, continuity, differentiability, integrability, series, sequences, derivatives, integrals, partial derivatives, and multiple integrals; axioms of probability, random variables, conditional probability and Bayes's Theorem, joint and conditional probability distributions and expectations; loss frequency, loss severity, retention, deductible, coinsurance, and risk premium.

Prerequisite: MATHS 267, 320, 321; RMI 270; or permission of the department chairperson.

Not open to students who have credit in MATHS 355.

556 Introduction to Operations Research. (3) Optimization techniques of linear programming, dynamic programming, and integer programming. Optimal solutions of PERT-CPM networks. Optimal decision strategies.

Prerequisite: MATHS 162 or 166, 217 or permission of the department chairperson.

Not open to students who have credit in MATHS 456.

557 Loss Distributions. (4) Loss distributions, making inferences from insurance data, limited expected value, loss elimination ratio and excess ratio, frequency distributions, classical, Bayesian, and Buhlmann credibility theory and experience rating, assumptions underlying different methods and comparing and contrasting them.

Prerequisite: MATHS 321.

Not open to students who have credit in MATHS 457.

558 Practicum in Actuarial Science. (2) Presentations by and discussions with practicing actuaries on problems drawn from their expertise, including life insurance, casualty insurance, health insurance, and professional ethics. Completion of authentic, meaningful projects identified by participating actuaries.

Prerequisite: MATHS 351 or 551; RMI 270 or 597; or permission of the department chairperson.

Not open to students who have credit in MATHS 458.

560 History of Mathematics. (3) The development of mathematics from prehistory to the seventeenth century. Topics may include number concepts and numeration, algebra, geometry, trigonometry, analytic geometry, and calculus.

Prerequisite: MATHS 161 or 165.

Not open to students who have credit in MATHS 460.

562 Numerical Analysis 1. (3) Topics include error analysis, approximation and interpolation of functions, solutions of nonlinear equations, approximate differentiation and integration, and orthogonal polynomials. Includes programming of numerical algorithms.

Prerequisite: CS 120; MATHS 162 or 166.

Not open to students who have credit in MATHS 362 or CS 362.

563 Numerical Analysis 2. (3) Topics include approximate solution of linear and nonlinear systems of equations by direct and iterative methods, spline interpolation, numerical solution of ordinary and partial differential

equations. Includes programming of numerical algorithms.

Prerequisite: MATHS 217; CS 362 or MATHS 362 or 562.

Not open to students who have credit in CS 363.

568 Unpaid Professional Experience in Mathematical Sciences. (1–8)

Supervised unpaid work and learning experience as a practicing mathematician, statistician, or actuarial scientist. Practical problem-solving experience will be gained through an internship, practicum, or other such situation.

Prerequisite: permission of the department chairperson.

A total of 8 hours of credit may be earned in MATHS 568 and 569 combined.

569 Paid Professional Experience in Mathematical Sciences. (1–8)

Supervised paid work and learning experience as a practicing mathematician, statistician, or actuarial scientist. Practical problem-solving experience will be gained through an internship, practicum, or other such situation.

Prerequisite: permission of the department chairperson.

A total of 8 hours of credit may be earned in MATHS 568 and 569 combined.

571 Real Analysis 1. (3) Properties of the real numbers. Cardinality. Topological properties of metric spaces: compactness, completeness, connectedness. Continuous functions. Differential calculus of real- and vector-valued functions of one and several real variables.

Prerequisite: MATHS 217, 267.

Not open to students who have credit in MATHS 471.

572 Real Analysis 2. (3) Inverse and implicit function theorems, extremum problems. Infinite series and products. Functions of bounded variation. The Riemann-Stieljes integral and Fundamental Theorem of Calculus. Sequences of functions. Multiple Riemann integrals.

Prerequisite: MATHS 471 or 571.

Not open to students who have credit in MATHS 472.

573 Boundary Value Problems. (3)

Fourier Series and integrals, heat and wave equations in one dimension, Laplace equation in two dimensions,

problems in higher dimensions, and numerical methods of solving boundary value problems.

Prerequisite: MATHS 374.

Not open to students who have credit in MATHS 473.

617 Algebra and Functions for Elementary and Middle School Teachers. (3) Algebra as the study of patterns, as a symbolic language; as a tool for problem solving, as the study of functions, as generalized arithmetic, and as a way of modeling physical situations.

Prerequisite: at least one year of elementary or middle school teaching experience or permission of the department chairperson.

618 Number Systems and Number Theory for Elementary and Middle School Teachers. (3) Number systems, properties and characteristics of classes of numbers, number sense, number theory, operations and their relationships, and algorithms.

Prerequisite: at least one year of elementary or middle school teaching experience or permission of the department chairperson.

619 Special Studies in Algebra. (1-8) Individual work under the direction of a staff member of the Department of Mathematical Sciences will involve assigned reading and reports and may involve class attendance in related courses.

Prerequisite: permission of the department chairperson.

MATHS 619, 649, 669, and 679, singly or in combination, may be taken for a total of no more than 8 hours of credit.

620 Mathematical Theory of Statistics 1. (4) Probability set functions, random variables, density functions, distribution functions, mathematical expectations, moment generating functions, Chebyshev's inequality, marginal and conditional distributions, some special distributions, distributions of functions of random variables, limiting distributions, sampling distributions, Central Limit Theorem.

Prerequisite: MATHS 166.

621 Mathematical Theory of Statistics 2. (4) Classical and Bayesian estimation, sufficiency, completeness, uniqueness, likelihood function, exponential families, Rao-Blackwell theorem, Rao-Cramer inequality, hypothesis testing, Neyman-Pearson lemma likelihood

ratio tests, goodness-of-fit, contingency tables, nonparametric tests, distribution of quadratic forms, correlation, and regression.

Prerequisite: MATHS 620.

625 Probability Theory and Applications. (3) Basic probability theory, random variables, conditional probability and conditional expectation, Poisson process, interarrival time and waiting time distributions.

Prerequisite: MATHS 166 or equivalent.

626 Probability and Stochastic Processes. (3) Discrete and continuous time Markov chains, queuing theory, renewal theory.

Prerequisite: MATHS 625.

627 Applied Statistics. (4) Descriptive statistics, binomial and normal distributions, confidence intervals, tests of significance, regression and correlation, analysis of variance. Applications stressed. Some use of statistical packages will be made. No previous computer experience necessary.

628 Monte Carlo Methods. (4) The theory of Monte Carlo methods and their applications in scientific computing. Study of pseudorandom number generation, statistical tests for randomness, generation of nonuniform random variables, and variance reduction techniques. Selected applications from numerical integration, computational finance, and linear algebra. Low-discrepancy sequences and hybrid-Monte Carlo methods.

Prerequisite: MATHS 625.

631 Technology for Mathematics Teachers. (3) Modeling, computational, and communication tools used in teaching mathematics.

Prerequisite: at least one year of teaching experience or permission of the department chairperson.

632 Assessment in Mathematics Education. (3) Issues related to assessment in mathematics education and the relationship of assessment to curriculum and instruction. Examination of various types of assessments administered in mathematics classrooms, as well as large-scale local, national, and international assessments.

Prerequisite: at least one year of teaching experience or permission of the department chairperson.

641 Topics in Geometry. (3) A survey of topics in contemporary geometry from various perspectives, including conjecture and exploration, formal analysis, and application beyond geometry.

Prerequisite: MATHS 345 or the equivalent.

644 Geometry and Measurement for Elementary and Middle School Teachers. (3)

Students will develop visualization skills; identify two- and three-dimensional shapes and know their properties; connect geometry to other mathematical topics; research historical topics relevant to elementary and middle school geometry.

Prerequisite: at least one year of elementary or middle school teaching experience or permission of the department chairperson.

645 Topology 1. (3) Set theoretic preliminaries, the axiom of choice, Zorn's lemma and the well-ordering principle, topological spaces, continuity, separation axioms, nets and filters, connectedness, local connectedness, product and quotient topologies, metric spaces, metrization.

Prerequisite: MATHS 472 or 572.

646 Topology 2. (3) Uniform spaces, paracompactness, open coverings, compactness, compactification, local compactness, function spaces, Stone-Weierstrass theorem, complete spaces, Banach fixed-point theorem, introductory homotopy theory. Introduction to homology theory, Jordan curve theorem, Brouwer fixed-point theorem.

Prerequisite: MATHS 645.

649 Special Studies in Geometry or Topology. (1–8) Individual work under the direction of a staff member of the Department of Mathematical Sciences will involve assigned reading and reports and may involve class attendance in related courses.

MATHS 619, 649, 669, and 679, singly or in combination, may be taken for a total of no more than 8 hours of credit.

655 Topics in Actuarial Science. (4) Advanced actuarial principles in the fields of investments and asset management. Topics include capital markets, investment vehicles, derivatives-applications, principles of portfolio management, asset-liability management, design and valuation for the various actuarial models.

Prerequisite: MATHS 551.

657 Survival Models. (4) Basic functions related to survival models, common parametric models, maximum likelihood estimation for censored or truncated data, nonparametric estimation, hypothesis testing, models with covariables, exposure to risk, practical aspects of tabular survival models.

Parallel: MATHS 552.

658 Risk Theory. (4) Individual and collective risk theory. Probability of ruin. Probability distributions of random numbers of random variables.

Prerequisite: MATHS 552.

659 Research in Actuarial Science. (3) Research study in actuarial subjects of current interest in life, property/casualty, health, and/or pension. Literature searches on selected topics. Articles from research journals will be read and discussed. Will use actuarial skills from several courses. A paper will be required.

Prerequisite: MATHS 552.

660 Topics in the History of Mathematics. (3) In-depth study of selected topics in the history of mathematics.

Prerequisite: MATHS 162 or 165, 460 or 560.

669 Special Studies in Applied Mathematics. (1–8) Individual work under the direction of a staff member of the Department of Mathematical Sciences will involve assigned reading and reports and may involve class attendance in related courses.

MATHS 619, 649, 669, and 679, singly or in combination, may be taken for a total of no more than 8 hours of credit.

670 Elements of Analysis. (3) An introduction to elementary point-set topology; development of the limit concept related to sequences and functions; introduction to the development of real numbers through Cauchy sequences; applications of the limit concept in continuity, derivatives and integrals of elementary functions.

Prerequisite: MATHS 166.

671 Continuous and Discrete Mathematics for Elementary/Middle School Teachers. (3) Fundamental concepts and applications of calculus and discrete mathematics.

Prerequisite: MATHS 617 and 644 or permission of the department chairperson.

675 Theory of Functions of Real Variables 1. (3) The concept of measurability, simple functions, properties of measures, integration of positive as well as complex functions, sets of measure zero, Riesz representation theorem, Borel and Lebesgue measures, LP-spaces, Elementary Hilbert Space theory.

Prerequisite: MATHS 472 or 572.

676 Theory of Functions of Real Variables 2. (3) Banach spaces, Baire's theorem. Hahn-Banach theorem, complex measures, total variation, absolute continuity, Radon-Nikodym theorem, bounded linear functionals on LP, the Riesz representation theorem, product measures, the Fubini theorem, completion of product measures.

Prerequisite: MATHS 675.

677 Complex Variables 1. (3) Complex number systems, differentiation and integration, functions (analytic, entire, meromorphic) of one complex variable, singularities, complex integration, Cauchy's theorem, Cauchy's integral formula, power series, Laurent series, calculus of residues.

Prerequisite: MATHS 472 or 572.

678 Complex Variables 2. (3) Analytic continuation, Riemann surfaces, theorems of Weierstrass and Mittag-Leffler, solution of two-dimensional potential problem, conformal mapping, Schwartz-Christoffel transformations and their applications.

Prerequisite: MATHS 677.

679 Special Studies in Analysis. (1-8) Individual work under the direction of a staff member of the Department of Mathematical Sciences will involve assigned reading and reports and may involve class attendance in related courses.

MATHS 619, 649, 669, and 679, singly or in combination, may be taken for a total of no more than 8 hours of credit.

680 Special Studies in the Teaching of Mathematics. (1-6) The student will work under the direction of a staff member in the Department of Mathematical Sciences. Assigned reading and reports; possible class attendance in related courses.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned.

681 Data Analysis and Statistics for Elementary and Middle School

Teachers. (3) Students will select and use appropriate statistical methods to analyze data, develop and evaluate inferences and predictions that are based on data, and understand and apply the basic concepts of probability.

Prerequisite: at least one year of elementary or middle school teaching experience or permission of the department chairperson.

689 Research Methods in Mathematics and Statistics. (3) The scientific method in mathematical research. Location of relevant journal articles, reference books, and reviews. Development of research and problem-solving techniques. Each student will write a mathematical paper. The instructor will assist students whose work is of exceptional quality in submitting their results for publication.

690 Mathematics Instructional Strategies. (3) The use of laboratory and multisensory materials and other techniques in dealing with all students, but with primary emphasis on the undermotivated. Learning sequences in appropriate mathematical content areas and methods of implementing them.

691 Methods and Remediation Techniques in Elementary Mathematics. (3) Materials and methods used in teaching mathematics at the elementary school level. Emphasizes remediation techniques. Class ideas in teaching situations.

Prerequisite: MATHS 202.

692 Workshop in Elementary School Mathematics. (3-9) A two-week workshop to help teachers design, evaluate, develop, and learn the appropriate use of instructional materials for elementary school mathematics.

Prerequisite: MATHS 201.

A total of 9 hours of credit may be earned.

693 Standards-Based Mathematics Teaching in Elementary and Middle Schools. (3) An introduction to standards-based mathematics teaching. Issues related to teaching and learning mathematics in elementary and middle school. Focus is on problem solving and communication.

Prerequisite: at least one year of elementary or middle school teaching experience or permission of the department chairperson.

695 Standards-Based Mathematics Teaching in Secondary School. (3) An

introduction to standards-based mathematics teaching. Issues related to teaching and learning mathematics in secondary school. Focus is on problem solving and communication.

Prerequisite: at least one year of secondary mathematics teaching experience or permission of the department chairperson.

696 Action Research in Mathematics Education. (3) Teachers design and conduct action research projects in their own mathematics classrooms, and present their findings in oral and written reports.

Prerequisite: MATHS 698 or permission of the department chairperson.

697 Instructional Techniques in Mathematics. (3) A methodology of mathematics instruction based on the works of Ausubel, Bruner, Gagne, Piaget, et al., is developed. Emphasizes

psychologically referenced multisensory instruments and manipulative models that possess or exhibit mathematical concepts to be taught.

Prerequisite or parallel: MATHS 693 or 695.

698 Research Methods in Mathematics Education. (3) Research in mathematics education and research methodology/analysis, focusing largely on action research for classroom teachers of mathematics.

Prerequisite: at least one year of teaching experience and 9 hours of graduate credit in mathematics education.

699 Seminar in Mathematics. (1-6) For students who wish to pursue some particular problem or group of problems in mathematics. Assigned readings and conferences.

A total of 6 hours of credit may be earned.

CENTER FOR MEDICAL EDUCATION

www.bsu.edu/mcme

Maria Bingham Hall 207, (765) 285-1051

Director: Douglas A. Triplett

Graduate Faculty: Jarial, Lannoo, Walker, Webb

ANATOMY (ANAT)

601 Human Gross Anatomy. (8) A strong background in basic morphologic and functional relations. Emphasizes regional anatomy. Four two-and-one-half-hour laboratory periods weekly.

Prerequisite: admission to the medical education program.

606 Medical Neuroanatomy. (4) Normal structural and functional organization of the human central nervous system as a background for the interpretation of its dysfunction. Assumes prior knowledge of human peripheral nervous system and effector mechanisms. Two-and-one-half-hour lecture plus four hours of laboratory weekly.

Prerequisite: ANAT 601.

631 Medical Histology-Embryology. (5)

Normal and abnormal developmental processes related to the differentiation of tissues and organs; microscopic study of organs and tissues as background for physiological and pathological consideration.

Prerequisite: admission to medical education program.

BIOLOGY (BIO)

642 Medical Microbiology. (8) Microbiology for medical students with consideration of bacteria, fungi, viruses, and parasites as agents in human disease and the immunological and serological aspects of the host-parasite relationship.

Open only to medical students or by permission of the department chairperson.

653 Medical Genetics. (2) Genetics for medical students: basic genetic principles, human cytogenetics, molecular genetics, genetic epidemiology, probability, population and quantitative (multifactorial) genetics, dermatoglyphics, etiology of birth defects, inborn metabolic disorders, genetic screening and counseling, genetics of mental illness and cancer, pharmaco-genetics, immunogenetics, and genetic engineering.

Prerequisite: open only to medical students or by permission of the department chairperson.

CHEMISTRY (CHEM)

667 Medical Biochemistry. (6) Chemistry of major cellular constituents; enzymes as the catalysts of intracellular chemical reactions with emphasis on underlying principles of physical and organic chemistry. Intermediary metabolism of carbohydrates, lipids,

amino acids, and nucleotides; modern techniques employed in the study of metabolic processes; biosynthesis and degradation of intracellular components; hormonal regulation of metabolism.

Prerequisite: admission to medical education program.

PHYSIOLOGY (PHYSL)

640 Medical Physiology. (8) Summary of human physiology for medical students. Cellular and organ-system physiology; physiological regulation. Laboratory exercises will demonstrate general principles of physiology and introduce basic techniques and instrumentation.

Prerequisite: admission to medical education program.

645 Emergency Medicine. (2) Designed to develop an awareness of proper diagnosis and treatment during emergency medical care by professional medical personnel. Fractures; environmental emergencies; injuries to the eye, chest, abdomen; shock; and wound care.

Prerequisite: admission to the medical education program.

MODERN LANGUAGES AND CLASSICS

www.bsu.edu/languages

North Quadrangle 135, (765) 285-1361

Chairperson: Ronald Warner

Graduate Faculty: L. Barnette, W. Barnette, Gilman, Guzzo, Johnson, Koehler, Luke, Moulin, Pak, Rugsaken, Warner

CLASSICAL CULTURE (CC)

598 Reading Course. (3-9) An arranged course in selected readings.

Prerequisite: permission of the department chairperson.

A total of 9 hours may be earned.

FOREIGN LANGUAGE (FL)

590 Independent Study. (1-9) Topics to be chosen and investigated in consultation with a specific instructor.

A total of 9 hours of credit may be earned.

595 Methods and Materials for Teaching Foreign Language. (3) Current methods in foreign language teaching in the senior high school. Presentation, texts, teaching materials, CAI, and other supplementary aids. Reviews current professional literature, trends, and requirements.

Prerequisite: two years of college credit or the equivalent in a modern language and intention to pursue a teaching curriculum.

Prerequisite recommended: EDSEC 380.

596 Technology and Assessment in Foreign Language. (3) Current theory and practice of technology and assessment in the foreign language classroom. Evaluation of resources, preparation of instructional materials and instruments, articulation and integration of technology and assessment into curricula and lesson plans. Audio, video, and computer-based technologies. Assessment of oral, aural, writing, reading, and culture.

Prerequisite recommended: FL 595.

Open only to education majors or minors.

599 Research Seminar. (3) Introduction to research in foreign languages and literature. Survey, discussion, evaluation, and application of research techniques in literary study, methodology, bibliography, and practical criticism.

FRENCH (FR)

500 French Study Abroad. (3–9) Study of advanced French language, literature, and culture in a country where French is the native language. May include seminars arranged during travel.

A total of 9 hours of credit may be earned.

501 Advanced Conversation. (3–6) Advanced practice in oral French to increase fluency and authenticity through discussion and debate.

A total of 6 hours of credit may be earned in combination with FR 301.

502 Composition and Stylistics. (3–6) Advanced practice in original composition with emphasis on style and stylistics.

A total of 6 hours of credit may be earned in combination with FR 302 or 303.

503 Advanced Grammar. (3) Advanced, in-depth study of French grammar with work in French-English translation.

534 Contemporary France. (3) Present-day France and French institutions viewed in the context of French perceptions of the family, education, politics, the judicial system, the economy, and religion. Supplementary readings in current newspapers and periodicals.

Prerequisite: FR 201, 202.

Not open to students who have credit in FR 404.

538 Business French. (3) Designed to make the advanced French student familiar with commercial forms and terminology used in business, banking, and industry.

Not open to students who have credit in FR 338.

550 Workshop in Contemporary Francophone Issues. (3–6) For inservice teachers who want to increase their proficiency in speaking and hearing the French language and their understanding of issues in present-day France and French-speaking countries.

Prerequisite: at least one year's teaching experience.

A total of 6 hours of credit may be earned.

598 Readings. (3–9) Individualized reading or research to allow students to explore special topics with a specific instructor. Designed to meet the needs of graduate students who have special projects in French.

A total of 9 hours of credit may be earned.

599 Bibliography and Readings. (3) Major works, primary and secondary sources in French language, literature, culture, and teaching.

Prerequisite: 15 hours of graduate credit in French and permission of the department chairperson.

GERMAN (GER)

500 German Study Abroad. (3–9) Study of advanced German language, literature, and culture in a country where German is spoken as a native language. May include seminars arranged during travel.

A total of 9 hours of credit may be earned.

501 Advanced Conversation. (3–6) Advanced practice in oral German to increase fluency and authenticity in the language.

A total of 6 hours of credit may be earned.

502 Composition and Stylistics. (3–6) Advanced practice in written German, with emphasis on style and stylistics.

A total of 6 hours of credit may be earned.

550 Workshop in Contemporary German Issues. (3–6) For inservice teachers who want to increase their

proficiency in speaking and hearing the German language and their understanding of issues in present-day Germany and German-speaking countries.

Prerequisite: at least one year of teaching experience.

A total of 6 hours of credit may be earned.

598 Readings. (3-9) Individualized reading or research to allow students to explore special topics with a specific instructor. Designed to meet the needs of graduate students who have special projects in German.

A total of 9 hours of credit may be earned.

LATIN (LAT)

501 Didactic Poetry. (3) Selected readings from Lucretius, Vergil's *Georgics*, or Ovid's *Ars Amatoria*.

502 Advanced Prose Composition. (3-6) A detailed grammar review, analysis of Latin prose style, composition of extended passages in Latin.

A total of 6 hours of credit may be earned.

507 Cicero. (3) Selected readings from Cicero's rhetorical and philosophical works.

508 Republican Historiography. (3) Selected readings from Caesar, Sallust, Nepos.

509 Imperial Historiography. (3) Selected readings from Livy, Tacitus, Suetonius.

510 Roman Drama. (3) Selected readings from Plautus, Terence, or Seneca.

512 Lyric Poetry. (3) Selected readings from Catullus or Horace's odes and epodes.

513 Elegiac Poetry. (3) Selected readings from the elegiac poems of Tibullus, Propertius, and Ovid.

Not open to students who have credit in LAT 304.

514 Vergil: *Aeneid*. (3) Selected readings.

515 Satire. (3) Selected readings from Horace, Persius, Martial, Juvenal.

516 Silver Latin Epic. (3) Selected readings from Ovid's *Metamorphoses*, Lucan, or Statius.

Not open to students who have credit in LAT 301.

522 Silver Latin Prose. (3-6) Selected readings from Petronius, Seneca the Younger, Quintilian, Pliny the Younger, Apuleius.

A total of 6 hours of credit may be earned.

525 Workshop for Teachers. (3) For inservice teachers wishing to improve their personal proficiency and update teaching methods and techniques.

Prerequisite: at least one year of teaching experience.

598 Readings. (3-9) Individualized readings or research allows students to explore special topics with a specific instructor.

A total of 9 hours of credit may be earned.

SPANISH (SP)

500 Spanish Study Abroad. (3-9) Study of advanced Spanish language, literature, and culture in a country where Spanish is the native language. May include seminars arranged during travel.

A total of 9 hours of credit may be earned.

501 Advanced Conversation. (3-6) Advanced practice in oral Spanish to increase fluency and authenticity through activities, discussion, and debate.

A total of 6 hours of credit may be earned.

502 Composition and Stylistics. (3-6) Advanced practice in original composition with emphasis on style and stylistics.

A total of 6 hours of credit may be earned.

503 Advanced Grammar. (3) Advanced, in-depth study of Spanish grammar with emphasis on analysis and creative expression in the language.

511 Spanish Literature from the Seventeenth through the Nineteenth Century. (3) The history of Spanish literature from the latter part of the Golden Age through late Romanticism. Representative works and authors.

512 Latin American Literature through the Nineteenth Century. (3) Major works of Spanish American literature from the chronicles to modernism.

519 Twentieth-Century Spanish Literature. (3) Acquaints students with the major literary works (in all genres)

reflecting changing currents in Spanish life and thought during this century. Readings will include works of the Generation of '98, the Generation of '27, and post-Civil War works.

534 Contemporary Spain. (3) Present-day Spain and Spanish institutions viewed in the light of Spanish perceptions. Topics vary according to changing conditions and problems.

Not open to students who have credit in SP 334.

535 Contemporary Latin America. (3) Elements of present-day problems and conditions in various countries or areas of Latin America. Topics vary according to changing conditions and problems.

Not open to students who have credit in SP 335.

537 Special Language Skills. (3-9) Topics vary and will be announced. Topics may be, among others, advanced study in phonetics, composition, linguistics, Spanish-English translation, or Spanish for the professions.

A total of 9 hours of credit may be earned.

Not open to students who have credit in SP 337.

538 Business Spanish. (3) Designed to make advanced Spanish students familiar with commercial forms and

terminology used in business, banking, and industry.

Not open to students who have credit in SP 338.

548 Twentieth-Century Latin American Literature. (3) Main trends in Spanish American literature (in all genres) since modernism. Includes modernism, realism, post-modernism, and recent literary trends.

550 Workshop on Contemporary Issues. (3-6) For inservice teachers wishing to improve their proficiency in contemporary Spanish usage.

Prerequisite: at least one year's teaching experience.

A total of 6 hours of credit may be earned.

598 Readings. (3-9) Individualized reading or research to allow students to explore special topics with a specific instructor. Designed to meet the needs of graduate students who have special projects in Spanish.

A total of 9 hours of credit may be earned.

599 Bibliography and Readings. (3) Major works, primary and secondary sources in Hispanic language, literature, culture, and teaching.

Prerequisite: 15 hours of graduate credit in Spanish.

NATURAL RESOURCES AND ENVIRONMENTAL MANAGEMENT

www.bsu.edu/nrem

West Quadrangle 110, (765) 285-5780

Chairperson and Graduate Advisor: Hugh Brown

Graduate Faculty: Brown, Chandler, Eflin, Godish, Lowe, Lyon, Pichtel, Sheaffer, Van Meter

PROGRAMS

Master of science (M.S.) in natural resources and environmental management and master of arts (M.A.) in natural resources and environmental management.

See the Science listing under the College of Sciences and Humanities, page 148, for the doctoral programs in science and science education.

Admission

Applicants must meet the admission requirements of the Graduate School,

take the Graduate Record Examination, and complete departmental admission forms. Applicants whose undergraduate majors are not natural resources or closely related subjects may be required to complete undergraduate courses to acquire background knowledge. Credit for these courses does not apply to degree requirements. Assignment to, or substitution for, the basic science courses (air, water, soil, and energy/minerals) will depend upon previous course work.

MASTER OF ARTS IN NATURAL RESOURCES AND ENVIRONMENTAL MANAGEMENT

Degree Requirements

| <i>PREFIX</i> | <i>NO</i> | <i>SHORT TITLE</i> | <i>CR HRS</i> |
|---------------|-----------|--------------------|---------------|
|---------------|-----------|--------------------|---------------|

Required courses

| | | | |
|------|-----|------------------|---|
| NREM | 511 | Water Resour (3) | |
| | | or | |
| | 521 | Soil Resourc (3) | 3 |
| | 531 | Enrg Min Res (3) | |
| | | or | |
| | 541 | Air Quality (3) | 3 |
| | 608 | Resch Method | 3 |
| | 609 | Seminar | 3 |

Electives

May include RES 697, or courses from NREM or such related departments as biology, geology, geography, landscape architecture, political science, and urban planning

21

33 hrs

NREM 601 may be required for students whose previous academic backgrounds are insufficient in natural resources and environmental management.

MASTER OF SCIENCE IN NATURAL RESOURCES AND ENVIRONMENTAL MANAGEMENT

Degree Requirements

| <i>PREFIX</i> | <i>NO</i> | <i>SHORT TITLE</i> | <i>CR HRS</i> |
|---------------|-----------|--------------------|---------------|
|---------------|-----------|--------------------|---------------|

| | | | |
|------|-----|------------------|---|
| NREM | 511 | Water Resour (3) | |
| | | or | |
| | 521 | Soil Resourc (3) | 3 |
| | 531 | Enrg Min Res (3) | |
| | | or | |
| | 541 | Air Quality (3) | 3 |
| | 608 | Resch Method | 3 |
| | 609 | Seminar | 3 |

Research requirement

| | | | |
|------|-----|--------------|---|
| THES | 698 | Thesis (1-6) | 6 |
|------|-----|--------------|---|

Electives from NREM or such related departments as biology,

geology, geography, landscape architecture, political science, and urban planning

15

33 hrs

NREM 601 may be required for students whose previous academic backgrounds are insufficient in natural resources and environmental management.

Facilities and Special Programs

Facilities consist of teaching and research laboratories, lecture and discussion classrooms, a microcomputer lab, a darkroom, a student reading room, and a seminar-conference room. All classrooms and laboratories are accessible to students with disabilities.

University-owned properties—the Hults Environmental Learning Center, Christy Woods, Ball State Wildlife Preserve, and Ginn-Nixon Woods—near the Ball State campus serve as field laboratories for teaching and research. The city of Muncie and surrounding areas offer first-hand study of environmental issues such as air, water, and soil quality, energy issues, land-use planning, and recreational management.

Research equipment includes state-of-the-art instrumentation for analysis of a variety of contaminants of air, water, and land.

Each summer the department sponsors field courses in which students travel to diverse locations for study. Past field courses have studied resource management in the American West, the Great Lakes states, the Appalachians, Central America, and Europe.

In addition to off-campus field courses, the department offers practicum opportunities with federal, state, and private agencies in various facets of resource management.

NATURAL RESOURCES AND ENVIRONMENTAL MANAGEMENT (NREM)

502 Field Study. (1-6) Off-campus field studies for students with serious interests in specific topics of study or research linked to a specific geographically defined resource base. Locales and topics vary with interest of the instructor. Group air and surface travel and basic living conditions often required. Foreign language skills sometimes helpful.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned, or in combination with NREM 402.

503 Environmental Economics. (3) The application of economic principles to environmental problems. Emphasizes applying the economist's decision-making model to environmental issues and the advantages and shortcomings of the economist's analysis.

Prerequisite: ECON 201 or 509 and 3 hours of credit in natural resources, preferably NREM 101, or permission of the department chairperson.

Not open to students who have credit in ECON 311, 511, or NREM 303.

504 Sustainable Agriculture. (3) Natural resource use in agricultural systems with emphasis on principles of sustainability. Includes integrated pest management, permaculture, and other production practices that conserve soil, water, and biological resources. Field trips included.

Not open to students who have credit in NREM 304.

505 Integrated Resource Management. (3) Systems perspective on holistic or integrated planning and management of natural resources. Stresses data analysis and its role in the decision-making process.

Prerequisite: permission of the department chairperson.

Not open to students who have credit in NREM 405.

507 Environmental Management in Developing Countries. (3) Survey of challenges facing management of urban environments and the rural-urban interface in the developing nations of Asia, Africa, Latin America, and Pacific Oceania. Features interdisciplinary approach with frequent guest speakers to discuss existing and potential management, economic, technical, and policy solutions in their regional, cultural, and historic contexts.

Not open to students who have credit in NREM 307.

509 Sociopolitical Dimensions of Global Environmental Change. (3) Systematic exploration of major topics of human and environmental change from local to global scales, including population, energy, agriculture, industry, technology, urbanization, water, climate, natural hazards, socioeconomic systems, land use, trade, marginalized societies, and biodiversity.

Not open to students who have credit in NREM 309.

511 Water Resources. (3) The hydrologic cycles as an integral part of the resource base, the relationship of water to other natural resources, and its economic and social importance to humans. Water conservation practices emphasizing pollution abatement. Government and private participation and responsibilities in water conservation programs. Laboratory and fieldwork included.

Not open to students who have credit in NREM 211.

515 Principles of Water Quality Management. (3) Water quality, water treatment, and planning as related to water quality management, including the Safe Drinking Water Act. Water uses for agriculture, industry, public supply, recreation, and the role of regulatory agencies will also be studied. Laboratory and fieldwork included.

Prerequisite: NREM 211, CHEM 111 or the equivalent, or permission of the department chairperson.

Not open to students who have credit in NREM 315.

520 Wetland Characterization. (3) Study of wetland functions and values. Delineation of wetland boundaries according to the U. S. Army Corps of Engineers criteria (wetland hydrology, hydric soils, hydrophytic vegetation). Includes a substantial component of field work.

Prerequisite: permission of the department chairperson.

521 Soil Resources. (3) The basic properties of the soil portion of the ecosystem. Prime emphasis on the genesis and resulting chemical and physical characteristics of soils.

Prerequisite: BIO 112, CHEM 112, or the equivalent, or permission of the department chairperson.

Not open to students who have credit in NREM 221.

522 Soil Quality. (3) Chemical, physical, and biological properties of soil that affect plant production and other land uses. Emphasizes nutrient cycles in natural and cropped systems. Use and fate of pesticides. Land application of agricultural and urban wastes.

Prerequisite: NREM 221 or 521 or equivalent; CHEM 111 or equivalent or permission of the department chairperson.

Not open to students who have credit in NREM 322.

524 Soil Classification and Interpretation. (3) Soil genesis, morphology, classification, and survey. The relationship between soils information and land use; practical application in the decision-making process. Emphasizes field study of soils and their uses.

Prerequisite: NREM 221 or 521 or the equivalent or permission of the department chairperson.

Not open to students who have credit in NREM 324.

527 Soil Conservation and Management. (3) Principles and methods of controlling soil erosion, stressing use of basic soil concepts. Management systems and individual practices, with special emphasis on soil resource maintenance.

Prerequisite: NREM 221 or 521 or the equivalent or permission of the department chairperson.

Not open to students who have credit in NREM 327.

531 Energy and Mineral Resources: Issues and Choices. (3) Appraisal of the problems, prospects, and societal and technical issues surrounding the use of energy and mineral resources. Emphasizes environmental problems and ecoenergetics, consideration of the natural resource base, distribution and production problems, conservation, alternative energy systems, resource policy, and research.

Not open to students who have credit in NREM 331.

535 Renewable Energy and Sustainable Technology. (3) Exploration of alternative/renewable energy systems (wind, solar, hydro, biomass, geothermal, fuel cells). Case studies of sustainable technology emphasize topics including industrial ecology (life-cycle analysis, design for the environment, clean manufacturing, and impact assessment) and appropriate technology applications in developing countries. Problem-solving applications using various approaches.

Not open to students who have credit in NREM 335.

541 Air Quality. (3) Focuses on the contamination of the atmospheric environment. Topics include major contaminants; measurement techniques;

dispersion; effects on the atmosphere, human health, vegetation, and materials; regulatory requirements and practices; control measures; noise pollution. Lab and field experiences.

Not open to students who have credit in NREM 341.

546 Indoor Environmental Quality. (3) Focuses on problems in residential and nonresidential indoor environments; contaminants; health effects; sick buildings; diagnosis and measurement; mitigation measures. Lab and field experiences.

Not open to students who have credit in NREM 346.

547 Occupational/Industrial Hygiene. (3) Introduces the principles of assessing and controlling exposures to workplace hazards. Topics include occupational disease; exposure to contaminant gases, dusts, radiation, noise, and biological agents; ergonomic concerns; regulatory requirements; engineering control and personal protection equipment.

Not open to students who have credit in NREM 347.

548 Asbestos and Lead Management. (3) Principles and practices associated with conducting asbestos and lead inspections and exposure hazard assessments. Discussion of use, health effects, assessment methods, and regulatory requirements. State certifications available on successful completion. Field and hands-on experiences.

Not open to students who have credit in NREM 348.

550 Hazardous Materials Health and Safety. (3) Introduction to the health and safety principles and practices of working on hazardous waste sites, handling hazardous materials, emergency responses to chemical spills, and confined space entry.

Not open to students who have credit in NREM 350.

553 Turfgrass Management. (3) Maintenance of turfgrass lawns, golf courses, athletic fields, playgrounds, parks, and roadsides. Practical management recommendations including regional adaptation of grasses, soils, fertilization, general maintenance practices, diseases, and insect control. Stresses the identification of grass and weed species.

Not open to students who have credit in NREM 353.

557 International Rural Development.

(3) Analysis of rural development in Asia, Africa, and Latin America. Emphasizes the roles of population, agriculture, history, conflict, technology, international debt, multi-lateral organizations, and political and cultural traditions in development efforts. Interdisciplinary readings and case studies.

Not open to students who have credit in NREM 357.

565 Fishery Resources Management. (3)

The relationship of fisheries to other natural resources; a survey of aquatic habitats and the characteristics of fish that affect their management; basic principles, practices, and techniques of management of inland waters for fish production. Offered spring semester of even-numbered years.

Prerequisite: BIO 580; ZOOL 544, or permission of the department chairperson.

Not open to students who have credit in NREM 465.

571 Outdoor Recreation and Society. (3)

The role of outdoor recreation in modern society. Perspectives ranging from local to global. Examination of the history of growth in outdoor recreation in the United States to the present day, emphasizing issues in both public and private sectors. May require one weekend field trip in addition to regular laboratory periods.

Not open to students who have credit in NREM 371.

572 Applied Research Methods in Resource Management. (3)

Designed to train students in social science applications in natural resource and environmental management. These applications include quantitative and qualitative survey research designs, analysis of social data, and applications of survey results to political processes. Perspectives range from local to international.

Not open to students who have credit in NREM 372.

573 Outdoor Recreation Planning and Administration. (3)

Application of basic principles and procedures for the planning and administration of resource-based and activity-based recreation areas. May require one weekend field trip as well as in-class field trips.

Prerequisite: NREM 371 or 571 or permission of the department chairperson.

Not open to students who have credit in NREM 473.

577 Wilderness and Society. (3)

Defining wilderness, understanding its unique significance, and analyzing techniques of past and present management. Includes study of research in perception and use. Weekend trip to the Deam Wilderness—Hoosier National Forest or a state forest back-country area.

Not open to students who have credit in NREM 477.

581 Site Remediation Technologies. (3)

Engineering principles applied to selected environmental problems. Underground storage tank closure and removal; environmental site assessments; remediation of severely disturbed environments; site safety issues. Some environmental chemistry.

Prerequisite: NREM 221 or 521; CHEM 111, 112; or permission of the department chairperson.

Not open to students who have credit in NREM 481.

585 Principles of Wastewater Treatment. (3)

Maintenance of water resources through the application of wastewater treatment with emphasis on needs, treatment methods, and effects on receiving waters and other ecosystems. Basic wastewater analysis and testing procedures will be included.

Prerequisite: NREM 211; one college course in chemistry or permission of the department chairperson.

Not open to students who have credit in NREM 385.

586 Computer Applications in Environmental Management. (3)

Use of computer software applications for data analysis and management of natural and human-controlled environments. Work with word processors, spreadsheets, statistical analysis packages, presentation graphics, web browsers/editors, and computer simulation models. Requires basic understanding of computer operation.

Prerequisite: permission of the department chairperson.

Not open to students who have credit in NREM 286.

Open only to NREM majors.

587 Solid and Hazardous Waste Management. (3) Delineation of solid and hazardous waste management in the United States. Waste reduction, recycling, processing, and disposal methods are discussed. Technical, political, and economic aspects of waste management. Effects of improper disposal on environmental quality.

Not open to students who have credit in NREM 387.

588 Environmental Assessment and Analysis. (3) Experience with Phase I and Phase II environmental site assessments and environmental compliance audits. Exposure to ISO 14000 and other international compliance initiatives. Review of relevant United States environmental regulations. Substantial environmental chemistry.

Prerequisite: CHEM 111, 112, 231 or equivalent; or permission of the department chairperson.

Not open to students who have credit in NREM 488.

592 Environmental Interpretation. (3) Develops skills and techniques necessary to the interpretation of ecological and environmental characteristics of earth systems. Emphasizes field work and creative presentation of concepts, and organization and management of interpretive programs including sites and facilities.

Prerequisite: NREM 101 or the equivalent.

Not open to students who have credit in NREM 392.

595 Teaching Environmental Education. (3) Opportunities for enriching instruction through environmental education in formal and nonformal educational settings. Studies conservation, outdoor and environmental education, including teaching techniques and instructional resources used in each.

Prerequisite: NREM 101 or 601 or permission of the department chairperson.

Not open to students who have credit in NREM 395.

601 Natural Resources and People. (3) Development of the conservation movement, with a critical analysis of our resource base in relation to current and projected population demands. The

compelling interrelationships between humankind and natural resources, with emphasis on the ecological approach to resource management. Opportunities for curriculum enrichment by integrating conservation and outdoor education into all subject areas and grade levels; administrative considerations. Laboratory and field-work included.

608 Research Methodologies in Natural Resources and Environmental Sciences. (3) Development of concepts and skills for those preparing for graduate research in natural resources and environmental sciences. Introduction to research designs, data-gathering techniques, data analysis, and research planning. Emphasizes interpreting published research and the drafting of a concise research proposal.

609 Seminar. (3) Presentations of graduate student research or program projects. Discussion and critical examination of resource/environmental topics. Assessment of scientific inquiry by data analysis and interpretation.

Prerequisite: NREM 608 or permission of the department chairperson.

669 Paid Professional Practice. (1-3) Supervised financially supported professional experience in natural resource management, environmental education, or environmental protection. Establishes a bridge between academic and professional experiences. Available only on a prospective basis.

Prerequisite: permission of the department chairperson.

A total of 3 hours of credit may be earned; 6 hours of credit may be earned in combination with NREM 697.

Not open to students who have credit in NREM 696.

696 Professional Practice. (1-3) Supervised professional experience in natural resource management, environmental education, or environmental protection. Establishes a bridge between academic and professional experiences. Available only on a prospective basis.

Prerequisite: permission of the department chairperson.

A total of 3 hours of credit may be earned; 6 hours of credit may be earned in combination with NREM 697.

Not open to students who have credit in NREM 669.

697 Special Studies in Natural Resources and Environmental Sciences. (1-6) Opportunities to pursue special interests in natural resources and environmental sciences.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned in combination with NREM 669 or 696.

PHILOSOPHY AND RELIGIOUS STUDIES

www.bsu.edu/philosophy

North Quadrangle 211, (765) 285-1242

Chairperson: Juli Eflin

Graduate Faculty: Corbett, Eflin

PHILOSOPHY (PHIL)

500 History of Ancient Philosophy. (3) Development of philosophical theories and ideas from the rise of philosophy in Greece through the medieval period. Emphasizes the theories in relation to one another, the times that produced them, and the thinkers who offered them.

Not open to students who have credit in PHIL 300.

502 History of Modern Philosophy. (3) The development of philosophical theories and ideas from the Renaissance to the nineteenth century. Emphasizes these theories in relation to one another, the times that produced them, and the thinkers who offered them.

Not open to students who have credit in PHIL 302.

503 Reading and Special Study. (3) For superior students: guided reading and investigation in topics in philosophy not covered intensively in available courses.

A total of 6 hours of credit may be earned, but no more than 3 in any one semester or term.

510 Introduction to Theory of Knowledge. (3) A critical discussion of

leading theories and problems of knowledge. The condition of knowledge and rational belief, the different kinds of knowledge, the nature of truth, and the challenge of skepticism.

Not open to students who have credit in PHIL 410.

513 Philosophy of Science. (3) Central philosophical problems in the sciences such as the nature of scientific explanation, the testing of hypotheses, and ethical issues arising from science; for example, the use of human subjects in experimentation and prolonging life.

Not open to students who have credit in PHIL 313.

RELIGIOUS STUDIES (RELST)

503 Reading and Special Study. (3) For superior students: guided investigation of topics related to religion not covered intensively in other available courses.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned, but no more than 3 in any one semester or term.

PHYSICS AND ASTRONOMY

www.bsu.edu/physics

Cooper Science Complex 101, (765) 285-8860

Chairperson: David Ober

Graduate Advisor: David Ober

Graduate Faculty: Cosby, Errington, Grosnick, Islam, Joe, Jordan, Kaitchuck, Khatun, Ober, Robertson, Thomas, Watson

Programs

The department offers programs in professional physics that lead to the master of science (M.S.) degree or master of arts (M.A.) degree. A student may also select a program of study in physics education for prospective high school teachers of physics, which leads either to the master of arts (M.A.) or to the master of science (M.S.) degree, or the master of arts in education (M.A.E.) in physics. The M.A., M.S., and M.A.E. degree programs require a minimum of 33 hours, 6 of which may consist of courses in a minor area or electives in a related discipline. A student's curriculum must include a minimum of 24 hours of physics, applied physics, or astronomy, as approved by the department, which may include credit for successful completion of a thesis or research paper.

See the Science listing under the College of Sciences and Humanities, p. 147, for the doctoral programs in science and science education.

Admission

Applicants must meet the admission requirements of the Graduate School and the Department of Physics and Astronomy and take the Graduate Record Exam or an equivalent test.

MASTER OF ARTS IN PHYSICS

Degree Requirements

Requires the student to write a research paper on a research project in physics or physics education. The research paper earns a total of 3 hours of credit.

| <i>PREFIX</i> | <i>NO</i> | <i>SHORT TITLE</i> | <i>CR</i> | <i>HRS</i> |
|---------------|-----------|--------------------|-----------|------------|
|---------------|-----------|--------------------|-----------|------------|

Core requirements

| | | | | |
|-------|-----|-------------------|--|---|
| PHYCS | 534 | Thermodynamic (3) | | |
| | | or | | |
| | 675 | Thermal Phys (3) | | 3 |
| | 552 | Electrom Th (3) | | |
| | | or | | |
| | 673 | Electdynamcs (3) | | 3 |
| | 565 | Quant Mech | | 3 |
| | 671 | Clasicl Mech | | 3 |
| | 683 | Seminar (1-4) | | 3 |

Courses in physics, applied physics, or astronomy as approved by the department

9-15

Research requirement

| | | | | |
|-----|-----|--------------------|--|---|
| RES | 697 | Research Ppr (1-3) | | 3 |
|-----|-----|--------------------|--|---|

Minors and electives as

| | | | | |
|--|--|----------------------------|--|-----|
| | | approved by the department | | 0-6 |
|--|--|----------------------------|--|-----|

33 hrs

MASTER OF SCIENCE IN PHYSICS

Degree Requirements

Requires a 6-hour thesis, which is normally a formal report on the student's research in some feature of experimental or theoretical physics or physics education.

| <i>PREFIX</i> | <i>NO</i> | <i>SHORT TITLE</i> | <i>CR</i> | <i>HRS</i> |
|---------------|-----------|--------------------|-----------|------------|
|---------------|-----------|--------------------|-----------|------------|

Core requirements

| | | | | |
|-------|-----|-------------------|--|---|
| PHYCS | 534 | Thermodynamic (3) | | |
| | | or | | |
| | 675 | Thermal Phys (3) | | 3 |
| | 552 | Electrom Th (3) | | |
| | | or | | |
| | 673 | Electdynamcs (3) | | 3 |
| | 565 | Quant Mech | | 3 |
| | 671 | Clasicl Mech | | 3 |
| | 683 | Seminar (1-4) | | 3 |

| | |
|---|--------|
| Courses in physics, applied physics, or astronomy as approved by the department | 6–12 |
| Research requirement THES 698 Thesis (1–6) | 6 |
| Minors and electives as approved by the department | 0–6 |
| | 33 hrs |

Topics for research leading to an M.S. or M.A. degree may include applied nuclear (Radon) studies; condensed matter/nanostructure studies; observational stellar astronomy, galactic structure, and extragalactic astronomy; solar energy applications; microprocessor-based instrumentation; computer vision; radiocarbon dating; elementary particle physics (BSU/Fermi Lab); physics studies applied to policies on arms control, energy, and the environment; and physics education.

If the student chooses experimental physics as a research topic, it normally will be in one of the above areas for which laboratory and apparatus are available. However, it is possible for research to be conducted at a cooperating industrial or national research and development laboratory or educational institution. For research in both experimental and theoretical physics, remote access to the university's central computer is available; students also have access to desktop computers in the department. Students' choices of research topics must be approved by the department.

Assistantships

Normally students who are awarded graduate assistantships will need about two years to complete work for the master's degree. Students should allow a minimum amount of time equivalent to about three semesters of thesis research for initial approval, completion, and final acceptance by the department and the Graduate School.

MASTER OF ARTS IN EDUCATION IN PHYSICS

Admission

Applicants must meet the admission requirements of the Graduate School and the Department of Physics and Astronomy and take the Graduate Record Exam or an equivalent test.

Designed for students choosing a profession in public school teaching.

Candidates must possess a valid teaching license or be in the process of securing a Senior High, Junior High/Middle School, or Secondary School teaching license.

Degree Requirements

Requires students to write research papers on research projects in physics, astronomy, physics education, or astronomy education. The research paper earns a total of 3 hours of credit.

PREFIX NO SHORT TITLE CR HRS

| | |
|--|--------|
| 12–18 hours from PHYCS, APHYS, ASTRO as approved by the department | 12–18 |
| 9 hours from Professional Education Core | 9 |
| 0–6 hours from Minors and non-departmental electives as approved by the department | 0–6 |
| Research requirement RES 697 Research Ppr (1–3) | 3 |
| | 30 hrs |

APPLIED PHYSICS (APHYS)

510 Introduction to Nanoscience and Technology. (3) Explores science and technology at the nanoscale. Studies the physical properties of nanomaterials, the tools and techniques for nanosystem fabrication and investigation; principles of mechanical, optical, electrical, and magnetic nanosystems; current state of technology in physics, chemistry, biology, engineering, and information systems; and future applications.

Prerequisite: PHYCS 260.

520 Solar Thermal Systems. (3) Physics of the solar energy resource, solar collection, concentration, thermal conversion, energy storage, and the design and performance of solar thermal energy systems.

Prerequisite: PHYCS 122; MATHS 162 or 166.

Not open to students who have credit in APHYS 420.

522 Photovoltaics. (3) Physics of photovoltaic systems, including basic operating principles, design and technology, and performance of individual solar cells and solar cell systems.

Prerequisite: PHYCS 260; MATHS 162 or 166.

Not open to students who have credit in APHYS 422.

ASTRONOMY (ASTRO)

530 Astronomy and Astrophysics 1. (4) A review of mechanics, electromagnetic radiation, and atomic structure in modern observational astrophysics. Solar system astrophysics—including an introduction to celestial mechanics and astronomical coordinate and time systems—are surveyed, and astronomical instruments are discussed.

Prerequisite: ASTRO 122; PHYCS 122.

Not open to students who have credit in ASTRO 330.

532 Astronomy and Astrophysics 2. (4) An examination of observational stellar astronomy with applications to the study of stellar structure and evolution and a review of the physics of stellar systems like star clusters, galaxies, and clusters of galaxies.

Prerequisite: ASTRO 530.

Not open to students who have credit in ASTRO 330.

580 Seminar in Modern Astronomy. (3) Seminar covering selected topics in contemporary astronomy. Extensive use of library facilities including current journals and periodicals in astronomy. Discussions of current astronomical research.

Prerequisite: ASTRO 122 or permission of the department chairperson.

Not open to students who have credit in ASTRO 380.

582 Instruments and Techniques in Planetarium Operations. (3) Use of planetarium instruments, console, and chamber. Organization and evaluation of planetarium programs and exhibits.

Prerequisite: ASTRO 122 or permission of the department chairperson.

Not open to students who have credit in ASTRO 382.

586 Instruments and Techniques of Astronomy Workshop for Teachers. (2) Observatory and laboratory experience in investigating the modern techniques of imaging in observational astronomy. Characteristics of telescopes, CCD cameras, film and emulsions, electronic data acquisition and processing systems. Methods of reducing raw data.

602 Observational Astronomy Workshop for Teachers. (2) A laboratory-oriented course that prepares secondary teachers to explain celestial

events and patterns. Emphasizes development of skills for selecting resource materials, planning observation sessions, and using star charts and telescopes. Requires projects involving application of these subjects in an educational setting.

Not open to students who have credit in PHYCS 602.

604 Physical Foundations of Astronomy Workshop for Teachers. (2)

A lecture/laboratory course designed to teach secondary teachers the basic physical principles of modern astronomy and space science. Discusses fundamentals of mechanics and celestial mechanics, optics, and the structure of matter in the development of astronomical theories.

Not open to students who have credit in PHYCS 604.

606 Stellar Evolution and Black Holes Workshop for Teachers. (2)

Prepares secondary teachers to explain current theories of stellar properties and stellar evolution, including discussions of pulsars, neutron stars, and black holes. Requires instructional projects related to course topics.

Prerequisite: ASTRO 604 or PHYCS 604 or permission of the instructor.

Not open to students who have credit in PHYCS 606.

PHYSICS (PHYCS)

530 Mechanics. (3) Basic concepts of mechanics, general motion of particles in three dimensions. Simple and damped harmonic motion. Particle dynamics in noninertial frames of reference, central forces. Dynamics of systems of particles. Motion of rigid bodies in three dimensions. Dynamics of oscillation systems.

Prerequisite: permission of the department chairperson.

Not open to students who have credit in PHYCS 330.

534 Thermodynamics. (3) Laws of thermodynamics and introduction to the kinetic theory of gases. No regularly scheduled laboratory.

Prerequisite: PHYCS 330 or permission of the department chairperson.

Not open to students who have credit in PHYCS 434.

540 Physical Optics. (3) The electromagnetic wave theory of light; spectra, interference, diffraction, polarization, and double refraction.

Prerequisite: PHYCS 122.

Not open to students who have credit in PHYCS 340.

546 Acoustics. (3) Elements of pure and applied acoustics. Topics include solutions to the wave equation, acoustic impedances, electro-mechanical-acoustic analogies, direct-radiator loudspeaker and enclosure theory, and room acoustics.

Prerequisite: PHYCS 122.

Not open to students who have credit in PHYCS 346.

550 Electricity and Magnetism. (3)

Application of vector analysis to electrostatics, dipole and multipole fields, and dielectric theory, alternating currents, magnetic fields, and Maxwell's equations. No regularly scheduled laboratory.

Prerequisite: PHYCS 122; MATHS 267.

Not open to students who have credit in PHYCS 450.

552 Electromagnetic Theory. (3)

Electrostatic boundary-value problems, multipoles, dielectrics, magnetostatics, Maxwell's equation, EM waves and radiation, plasmas, relativistic kinematics and dynamics, and radiation of moving charges.

Prerequisite: PHYCS 450 or 550.

Not open to students who have credit in PHYCS 452.

554 Electronics I. (4) Introductory DC and AC circuit theory, semiconductor components, power supplies, transistor amplification, integrated circuit operational amplifiers, active filters, oscillators, and function generators. Basic combinational logic circuits and Boolean algebra. Emphasizes application of integrated circuits.

Prerequisite: PHYCS 122 or permission of the department chairperson.

Not open to students who have credit in PHYCS 354.

556 Electronics 2. (4) Sequential logic circuits including scalars, displays, memories, shift registers, analog-to-digital and digital-to-analog conversion techniques. Microprocessor architecture and support electronics for microcomputer design. IC chips and circuits for experiment to microcomputer interfacing. Use of a microprocessor development system.

Prerequisite: PHYCS 354 or 554.

Not open to students who have credit in PHYCS 356.

560 Introductory Nuclear Techniques. (3)

Experimental studies of radioactive disintegrations and decay products and their relationship to nuclear structure. Instrumentation in radioscope measurements. Two lectures and two two-hour laboratory periods a week.

Prerequisite: PHYCS 260.

Not open to students who have credit in PHYCS 360.

561 Elementary Particles. (3)

Investigates the nature and behavior of elementary particles through the study of the symmetries and dynamics responsible for their production, reactions, and decays.

Prerequisite: PHYCS 464 or 564.

Not open to students who have credit in PHYCS 461.

563 Nuclear Physics. (3) The nucleus and nuclear interactions. Theoretical and experimental elements of radioactive decay and models of the nucleus.

Prerequisite: PHYCS 260.

Not open to students who have credit in PHYCS 463.

564 Introduction to Quantum

Mechanics. (3) De Broglie's postulate, the uncertainty principle, the Schroedinger equation, the free particle, square well potentials, harmonic oscillator, the hydrogen atom, and angular momentum in quantum mechanics, and other selected wave mechanics problems. No regularly scheduled laboratory.

Prerequisite: PHYCS 260.

Not open to students who have credit in PHYCS 464.

565 Quantum Mechanics. (3) Review of barrier problems, the harmonic oscillator, and angular momentum using matrix methods. Problems involving perturbation theory, one-electron atoms, magnetic moments, spin, relativistic effects, symmetric and anti-symmetric wave functions, the helium atom, transition rates, and scattering theory.

Prerequisite: PHYCS 464 or 564.

Not open to students who have credit in PHYCS 465.

566 Solid State Physics. (3) Structure and physical properties of matter in the solid state. Electrical and magnetic properties and band theory of solids, with special emphasis on semiconductors.

Prerequisite: PHYCS 260.

Not open to students who have credit in PHYCS 466.

570 Introductory Mathematical Physics

1. (3) Application of mathematical techniques to the formulation and solution of physical problems in classical mechanics, thermodynamics, and electromagnetic theory and in quantum mechanics. Topics include computer algebra systems and applications.

Prerequisite: PHYCS 122, 260; or permission of the department chairperson.

Not open to students who have credit in PHYCS 370.

572 Introductory Mathematical Physics

2. (3) Techniques in the formulation and solution of physical problems. Computer algebra systems (e.g. Mathematica) may be introduced for the study of topics such as boundary value problems, transforms, special functions of mathematical physics, and applications of tensor analysis in physics.

Prerequisite: PHYCS 122, 260; or permission of the department chairperson.

Not open to students who have credit in PHYS 372.

580 Descriptive Astronomy. (3) The celestial sphere, the solar system, formation and decay of stars, instruments and basic laws of astronomy, nebulae, galactic structure, theories of the origin of the universe, and constellation and telescope work.

Not open to students who have credit in PHYCS 380.

602 Observational Astronomy Workshop for Teachers. (2)

A laboratory-oriented course that prepares secondary teachers to explain celestial events and patterns. Emphasizes development of skills for selecting resource materials, planning observation sessions, and using star charts and telescopes. Requires projects involving the application of these subjects in an educational setting.

Not open to students who have credit in ASTRO 602.

604 Physical Foundations of Astronomy Workshop for Teachers. (2)

A lecture/laboratory course designed to teach secondary teachers the basic physical principles of modern astronomy and space science. Fundamentals of mechanics and

celestial mechanics, optics, and structure of matter studied in the context of the development of astronomical theories.

Not open to students who have credit in ASTRO 604.

606 Stellar Evolution and Black Holes Workshop for Teachers. (2)

Prepares secondary teachers to explain current theories of stellar properties and stellar evolution, including discussions of pulsars, neutron stars, and black holes. Requires instructional projects related to course topics.

Prerequisite: ASTRO 604 or PHYCS 604 or permission of the instructor.

Not open to students who have credit in ASTRO 606.

625 Solar Energy Workshop for Teachers. (2)

Principles, techniques, and systems for using sunlight as an alternative energy source. Designed for junior high and high school science teachers. Emphasizes the physical principles of operation and the design of solar systems for space heating, water heating, and air conditioning for residential and commercial buildings and systems for electrical power generation. Laboratory experiments will give participants experience with solar hardware and design procedures.

Not open to students who have credit in APHYS 420, 520, or PHYCS 220.

641 Laser and Holography Workshop for Teachers. (2)

The field of lasers and holography for junior high and high school science teachers. Basic geometrical optics, physical optics, and atomic theory phenomena in relation to laser operation and hologram making. Laboratory-oriented with considerable emphasis on laser safety and the use of lasers for demonstrating optical phenomena in the classroom.

Prerequisite: PHYCS 112 or 122 or permission of the department chairperson.

Not open to students who have credit in PHYCS 340, 540.

647 Chemical Physics. (3) Selected topics related to the physics of the molecule and to some extent aggregations of molecules, including the theory of molecular electronic structure and the liquid state, and radiofrequency physics (NMR, ESR, NQR).

Prerequisite: PHYCS 465, 565, or permission of the department chairperson.

657 Introductory Integrated Circuit Analog Electronics Workshop for Teachers. (2) Laboratory-oriented course that acquaints teachers who do not have a strong electronics background with the uses of modern integrated circuitry. Emphasizes the construction and use of circuits that can be presented in the classroom.

Introduces analog electronics topics.

Prerequisite: PHYCS 112 or 122 or permission of the department chairperson.

Not open to students who have credit in PHYCS 354, 356, 554, 556.

658 Introductory Integrated Circuit Digital Electronics Workshop for Teachers. (2) Laboratory-oriented course that acquaints teachers who do not have a strong electronics background with the uses of modern integrated circuitry. Emphasizes the construction and use of circuits that can be presented in the classroom. Introduces digital and micro-processor electronics topics.

Prerequisite: PHYCS 112 or 122 or permission of the department chairperson.

Not open to students who have credit in PHYCS 354, 356, 554, 556.

659 Application of Nuclear Techniques Workshop for Teachers. (2)

Applications of nuclear techniques in research, medicine, the environment, energy production, and industry. Designed for junior high and high school science teachers. Laboratory oriented. Uses radiation detection devices and radiation safety procedures.

Prerequisite: PHYCS 112 or 122 or permission of the department chairperson.

Not open to students who have credit in PHYCS 360 or 560.

669 Work and Learning Experience in Physics. (1–3) Paid work and learning experiences in applied or theoretical physics in an institutional, industrial, or university research or development setting.

Prerequisite: approval of a proposed program by the department chairperson.

A total of 3 hours of credit may be earned.

No more than three hours in combination with PHYCS 369 may be used as approved electives toward a departmental major.

671 Classical Mechanics. (3) Classical Hamiltonian mechanics as applied to particles and rigid body motion.

Prerequisite: PHYCS 330 or permission of the department chairperson.

673 Electrodynamics. (3) Relativistic particle dynamics and relativistic field theory.

Prerequisite: PHYCS 565 or permission of the department chairperson.

675 Thermal Physics. (3) Thermal physics, kinetic theory, and statistical mechanics.

Prerequisite: PHYCS 434 or 534 or permission of the department chairperson.

677 Quantum Theory of Solids. (3) The quantum mechanical theory of the structure, cohesion, and static and dynamic processes in solids, particularly crystalline solids but with some reference to amorphous solids.

Prerequisite: PHYCS 565 or permission of the department chairperson.

681 Resources and Methodology of Physics Research. (3) Periodical resource material in physics, methodology of literature research. This course may be used to satisfy requirements of the graduate research methodology plan for a master's degree.

Prerequisite: permission of the department chairperson.

683 Seminar in Physics. (1–4) Critical examination and discussion of recent experimental and theoretical developments in physics. Participation in and contribution of a presentation at departmental physics colloquia are expected.

A total of 4 hours of credit may be earned.

685 Special Studies in Physics. (1–8) Special activities in physics involving one or more of the following: experimental work, study of advanced topics in physics, and attendance in prescribed classes.

Prerequisite: permission of the department chairperson.

A total of 8 hours of credit may be earned.

691 Advanced General Science. (3) Further study of the principles of physics, chemistry, meteorology, geology, and astronomy that were introduced in the prerequisite: PHYCS 101.

693 Theories of Physics for Secondary Physics Teachers. (3) Classical

mechanics, relativity, electricity, quantum mechanics, and statistical mechanics used to enable students to use new developments and recent scientific advances. Designed primarily for teachers and workers in the field who need to update their general knowledge of physics. No regularly scheduled laboratory.

Prerequisite: 8 hours of credit in college physics.

696 Modern Developments in Physics Teaching. (1-3) Recent developments in

secondary physics curricula, multimedia teaching methods, national and local trends in physics teaching, laboratory work, textbooks, tests.

Prerequisite: permission of the department chairperson.

A total of 3 hours of credit may be earned.

Not open to students who have credit in PHYCS 396.

790 Internship in Science Education. (3) Supervised experience in instruction of physics or science education courses.

PHYSIOLOGY AND HEALTH SCIENCE

www.bsu.edu/physiology

Cooper Science Complex 325, (765) 285-5961

Chairperson: Robert Pinger

Graduate Advisor: Jeffrey Clark

Graduate Faculty: Amschler, Bishop, Bock, Brey, Clark, Ganion, Godish, Hahn, Javed, Kotecki, McKenzie, Pinger, Wood, Zamlauski-Tucker

The Department of Physiology and Health Science offers graduate programs leading to either the master of arts or the master of science degree in health science or in physiology. Both physiology and health science may be used as academic cognate areas for students pursuing doctoral or specialist in education programs in related disciplines.

Although each graduate program has specific requirements, there is flexibility to meet individual students' interests and needs. For example, a student who wants to earn a master of science degree in either physiology or health science will be required to complete a thesis. Graduate students who wish to professionalize their Indiana teaching licenses in health and safety will complete appropriate course work in the master of arts or master of science degree program in health science.

PROGRAMS

Master of arts (M.A.) and master of science (M.S.) in health science or in physiology.

See the Science listing under the College of Sciences and Humanities, page 149, for the doctoral programs in science and science education.

Master's Programs in Health Science

Admission

Applicants must meet the admission requirements of the Graduate School and must have bachelor's degrees from accredited colleges or universities with at least academic minors in health education, health and safety education,

health science, or an equivalent subject. Students applying for graduate teaching assistantships must have grade point averages of at least 3.0 on a scale of 4.0.

MASTER OF ARTS IN HEALTH SCIENCE

This degree is designed for students seeking a comprehensive background in educational planning (including program development, implementation, and evaluation) relating to health promotion and disease prevention activities in community health agencies, wellness centers, health-care facilities, and business and industrial settings. Special course work in advanced health and safety methodology is offered for students seeking professionalization of their secondary teaching licenses in health and safety.

Degree Requirements

| PREFIX | NO | SHORT TITLE | CR HRS |
|--------|----|-------------|--------|
|--------|----|-------------|--------|

Core requirements

| | | | |
|-----------|-----|--------------------|-----|
| HSC | 670 | Research Tech | 3 |
| | 671 | Research Sem | 2 |
| | 687 | Qtn Meth Hsc (3) | |
| | | or | |
| EDPSY | 641 | Statist Meth (3) | 3 |
| RES | 697 | Research Ppr (1-3) | |
| | | or | |
| HSC | 697 | Spec Studies (1-3) | 3 |
| Electives | | | 5-7 |

Complete one of the following tracks

Community health education, 14 hours

| | | | |
|-----|-----|------------------|---|
| HSC | 585 | Co Hl Mthds | 4 |
| | 683 | Epidemiology | 3 |
| | 686 | Prg Pln Eval | 4 |
| | 669 | Pd HSC Pract (3) | |
| | | or | |
| | 675 | Internship (3) | 3 |

School health education, 12 hours

| | | | |
|-----|-----|---------------|---|
| HSC | 510 | Tch Lrn Ed | 3 |
| | 563 | Sch H E Contr | 3 |

6 hours from

| | | | |
|-----|-----|------------------|--|
| HSC | 550 | El S Hlth Pg (3) | |
| | 562 | Hl Pro Wkste (3) | |
| | 564 | H Ed Clinic (3) | |
| | 565 | Alcohol Prob (3) | |
| | 567 | Drug Depn Ab (3) | |
| | 568 | Con Hlth Iss (3) | |
| | 569 | Health Aging (3) | |
| | 571 | Death Dying (3) | |
| | 572 | Women Health (3) | |
| | 581 | Stress Mang (3) | |
| | 582 | Environ Hlth (3) | |
| | 589 | Pub Hlth Ent (3) | |

Category II or III education courses (3)

6

 30 hrs

MASTER OF SCIENCE IN HEALTH SCIENCE

The purpose, general nature, and admission standards of this degree program are similar to those of the M.A. curriculum with a major in health science. However, students are expected to demonstrate a higher level of research skills in this program by completing a thesis (THES 698).

| PREFIX | NO | SHORT TITLE | CR HRS |
|--------|----|-------------|--------|
|--------|----|-------------|--------|

Core requirements

| | | | |
|-----------|-----|------------------|-----|
| HSC | 670 | Research Tech | 3 |
| | 671 | Research Sem | 2 |
| | 687 | Qtn Meth HSC (3) | |
| | | or | |
| EDPSY | 641 | Statist Meth (3) | 3 |
| THES | 698 | Thesis (1-6) | 6 |
| Electives | | | 2-4 |

Complete one of the following tracks

Community health education, 14 hours

| | | | |
|-----|-----|------------------|---|
| HSC | 585 | Co Hl Mthds | 4 |
| | 683 | Epidemiology | 3 |
| | 686 | Prg Pln Eval | 4 |
| | 669 | Pd HSC Pract (3) | |
| | | or | |
| | 675 | Internship (3) | 3 |

School health education, 12 hours

| | | | |
|-----|-----|---------------|---|
| HSC | 510 | Tch Lrn Ed | 3 |
| | 563 | Sch H E Contr | 3 |

6 hours from

| | | | |
|-----|-----|------------------|--|
| HSC | 550 | El S Hlth Pg (3) | |
| | 562 | Hl Pro Wkste (3) | |
| | 564 | H Ed Clinic (3) | |
| | 565 | Alcohol Prob (3) | |
| | 567 | Drug Depn Ab (3) | |
| | 568 | Con Hlth Iss (3) | |
| | 569 | Health Aging (3) | |
| | 571 | Death Dying (3) | |
| | 572 | Women Health (3) | |
| | 581 | Stress Mang (3) | |
| | 582 | Environ Hlth (3) | |
| | 589 | Pub Hlth Ent (3) | |

Category II or III education courses (3)

6

 30 hrs

MASTER'S PROGRAMS IN PHYSIOLOGY

These programs are designed for students seeking in-depth coverage of physiological principles pertaining to

the human organism, endocrinology, renal function, cardiovascular dynamics, and pathophysiology.

Admission

Applicants must meet the admission requirements of the Graduate School and must also have bachelor's degrees from accredited colleges or universities with academic majors or minors in biology, the life sciences, or equivalent science fields. For students applying for graduate teaching assistantships, grade point averages of at least 3.0 on a scale of 4.0 are required.

MASTER OF ARTS IN PHYSIOLOGY

Degree Requirements

| <i>PREFIX</i> | <i>NO</i> | <i>SHORT TITLE</i> | <i>CR HRS</i> |
|-------------------|-----------|--------------------|---------------|
| PHYSL | 585 | Resrch Tech | 3 |
| CHEM | 563 | Prn Biochm 1 | 3 |
| | 564 | Prn Biochm 2 | 3 |
| 3 hours from | | | |
| PHYSL | 511 | Endocrinology (3) | |
| | 513 | Renal Physl (3) | 3 |
| 3 hours from | | | |
| PHYSL | 514 | Cardiovsclur (3) | |
| | 520 | Neuroscience (3) | 3 |
| 3-4 hours from | | | |
| ANAT | 520 | Hum Embryolg (3) | |
| | 530 | Histology (4) | 3-4 |
| PHYSL | electives | | 3 |
| General electives | | | 9 |
| | | | 30-31 hrs |

MASTER OF SCIENCE IN PHYSIOLOGY

Degree Requirements

| <i>PREFIX</i> | <i>NO</i> | <i>SHORT TITLE</i> | <i>CR HRS</i> |
|-------------------|-----------|--------------------|---------------|
| PHYSL | 585 | Resrch Tech | 3 |
| CHEM | 563 | Prn Biochm 1 | 3 |
| | 564 | Prn Biochm 2 | 3 |
| THES | 698 | Thesis (1-6) | 6 |
| 3 hours from | | | |
| PHYSL | 511 | Endocrinology (3) | |
| | 513 | Renal Physl (3) | 3 |
| 3 hours from | | | |
| PHYSL | 514 | Cardiovsclur (3) | |
| | 520 | Neuroscience (3) | 3 |
| 3-4 hours from | | | |
| ANAT | 520 | Hum Embryolg (3) | |
| | 530 | Histology (4) | 3-4 |
| General electives | | | 6 |
| | | | 30-31 hrs |

COGNATE AREAS FOR DOCTORAL DEGREE PROGRAMS

Health Science Cognate

This 15-hour or 24-hour concentration of courses in health science and related academic disciplines is offered to qualified doctoral students who want a high level of competency in advanced content and program planning, implementation, and evaluation pertaining to health promotion and disease prevention.

Physiology Cognate

This 15-hour or 24-hour concentration of course work in physiology, anatomy, and related science disciplines is offered to qualified doctoral students who want advanced courses in body function and structure.

ANATOMY (ANAT)

505 Human Neuroanatomy. (3) A strong background in the basic structural and functional relations of the central nervous system. Emphasizes the location of nerve-cell centers and the fiber tracts entering and leaving these centers. Two two-hour laboratory periods weekly.

Prerequisite: ANAT 201 or ZOOL 330.

Prerequisite recommended: ANAT 320 or 520 and ANAT 430 or 530.

Not open to students who have credit in ANAT 405.

520 Human Embryology. (3) Normal development of the human organism including germ cell formation, fertilization, implantation, and organ formation. Embryonic environment, physiology, and abnormal development.

Prerequisite: BIO 111 and 112 or ANAT 201.

Not open to students who have credit in ANAT 320.

530 Histology. (4) Microscopic structure of organisms with special emphasis on the tissue of vertebrates. Introductory micro-techniques. Three lectures and one laboratory period weekly.

Prerequisite: four courses in biological science.

Prerequisite recommended: BIO 460; ZOOL 330.

Not open to students who have credit in ANAT 430.

601 Human Gross Anatomy. (8) A strong background in basic morphologic and functional relations. Emphasizes

regional anatomy. Four two-and-one-half hour laboratory periods weekly.

Prerequisite: admission to the medical education program.

606 Medical Neuroanatomy. (4) Normal structural and functional organization of the human central nervous system as a background for the interpretation of its dysfunction. Assumes previous knowledge of human peripheral nervous system and effector mechanisms. Two-and-one-half hour lecture plus four hours of laboratory weekly.

Prerequisite: ANAT 601.

631 Medical Histology-Embryology. (5) Normal and abnormal developmental processes related to the differentiation of tissues and organs; microscopic study of organs and tissues as background for physiological and pathological consideration.

Prerequisite: admission to the medical education program.

690 Special Studies in Anatomy. (1-3) Problems of special interest in anatomy or in anatomy teaching. Individual work under the direction of a staff member may involve one or more of the following: experimental work, attendance in undergraduate classes, wide reading, and development of special techniques or skills in scientific investigation.

Prerequisite: permission of the department chairperson.

A total of 3 hours of credit may be earned.

HEALTH SCIENCE (HSC)

510 Teaching and Learning in Health Education. (3) Advanced methodology course covers essential conditions of the teaching and learning process including classroom organization, needs assessment, development of objectives and teaching and learning strategies, student and program evaluation, and individualizing instruction. Designed for graduate students wishing to professionalize the standard teaching certificate.

550 Elementary School Health Program. (3) School's role in promoting health and preventing disease among preschool and elementary school children. Focuses on the school health program (instruction, services, and environment), community resources,

and health problems common to school children.

Prerequisite: HSC 160.

Not open to students who have credit in HSC 350.

562 Health Promotion in the Worksite. (3) Explores the major components of planning, implementing, and evaluation of health promotion programs at the worksite.

Not open to students who have credit in HSC 462.

563 Dealing with Controversial Topics in School Health. (3) How to develop, implement, and teach controversial health education topics in a school education program. Helps teachers use educational techniques to develop constructive attitudes, values, and practices based on sound knowledge in accordance with recommendations and pertinent state guidelines.

Not open to students who have credit in HSC 463.

564 Health Education in the Clinical Setting. (3) Theories of client education and application of the educational process to individuals and groups in a variety of health-care settings. Emphasizes the multidisciplinary team concept in planning, implementing, and evaluating client education. Application of knowledge of growth and development in meeting learning needs of clients from a variety of ages and intellectual levels.

Not open to students who have credit in HSC 464.

565 Alcohol Problems. (3) Alcohol as a mood modifier and its use, nonuse, and abuse in drinking societies. Critical and controversial issues relevant to alcohol ingestion will be explored for medical, economic, legal, educational, historical, physiological, and public health implications.

Not open to students who have credit in HSC 465.

567 Drug Dependence and Abuse. (3) The medical, psychological, sociological, and legal dimensions of drug use in the United States. Examines the incidence and prevalence of drug abuse along with the roles played by the school and community in dealing with this health problem.

Not open to students who have credit in HSC 467.

568 Consumer Health Issues. (3) Health services and consumer protection organizations. Analysis of fraudulent health practices and nostrums, available health care systems, and health products.

Not open to students who have credit in HSC 468.

569 Health and Aging. (3) Dynamics of later life and the aging process with specific emphasis on health. The physiological and behavioral dimensions of the aging process.

Not open to students who have credit in HSC 469.

571 Death and Dying. (3) The relationship between death and health with emphasis on physiological, psychological, legal, and medical aspects of death in contemporary America. Roles of individual, family, school, community, and various professionals. Problems in meaning of death, care of the dying, death education, and attitudes toward death.

Prerequisite: HSC 160 or permission of the department chairperson.

572 Women and Health. (3) General overview of issues related to women and health: health needs of working women, special nutritional concerns, the gynecological exam, reproductive anatomy and physiology, fertility and infertility, breast problems, wife abuse, and rape.

Not open to students who have credit in HSC 472.

581 Stress Management. (3) Aids in understanding the physiological, psychological, and sociological aspects of stress. Students will increase their awareness of the effects of stress, identify personal stress triggers, and develop strategies to minimizing stress throughout their daily lives.

Not open to students who have credit in HSC 481.

582 Environmental Health. (3) Physical environment and its relationship to disease causation. Review of environmental health problems and their solutions. Areas of study include air and water pollution, food sanitation, disposal of human excreta and waste, radiation and occupational health problems, and risk.

585 Community Health Methods. (4) Provides the skills necessary to become effective community health educators

including policy development, advocacy, coalition building, grant writing, cultural competency, fund raising, and community health assessment.

Not open to students who have credit in HSC 385.

589 Public Health Entomology. (3) A survey of diseases caused or transmitted by insects and other arthropods. Emphasizes the recognition of medically important arthropods and their biology and control. A weekly three-hour laboratory provides an opportunity to collect and study live and preserved arthropod specimens.

Not open to students who have credit in HSC 389.

598 Workshop in Health Science. (1-6) Critical contemporary issues in health science. May include consultants, guest lecturers, field trips, and group activities.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned.

669 Paid Health Science Practicum. (3) A paid work and learning experience in an approved health agency, facility, educational institution, professional organization, or private business for a time commensurate with the hours of credit to be earned. Assignments depend upon students' interests and the resources of participating organizations.

Prerequisite: permission of the department coordinator of practicums and internships.

A total of 6 hours of credit may be earned, but no more than 3 in any one semester or term.

670 Health Science Research Techniques. (3) An introduction to the study and practical application of research design as it applies to the health sciences. Emphasizes the necessary skills and competencies required to develop an acceptable research proposal.

671 Research Seminar. (2) Review, analysis, and discussion of the literature related to selected topics of current interest in health science. Includes public presentation of research proposal.

Prerequisite: HSC 670.

Open only to students enrolled in health science master's degree programs.

675 Internship in Health Science. (3)

The intern will be assigned to an approved health agency or educational institution for a period of time commensurate with the hours of credit to be earned. Students will make periodic and final reports to an academic advisor and to the administrator of the participating agency.

Prerequisite: permission of the department coordinator of practicums and internships.

A total of 6 hours of credit may be earned, but no more than 3 in any one semester or term.

A total of 6 hours of credit may be earned in this course or in combination with HSC 479 and 669.

683 Epidemiology. (3) Introduction to principles and methods of epidemiology, including appropriate uses of descriptive, analytical, and experimental approaches to the study of classic epidemics and contemporary health problems.

Prerequisite: HSC 180, 385 or 585, and 687.

686 Health Promotion Program Planning and Evaluation. (4) Advanced study of program development, implementation, and evaluation. Includes an in-depth examination of the theories, models and techniques/methods associated with these processes.

687 Application of Quantitative Methods in Health Science. (3)

Advanced study of the application of quantitative methods in health promotion. Uses various approaches to identify, evaluate, compare, and report data used to describe health-promotion programs. One two-hour laboratory period weekly emphasizes data manipulation using a microcomputer.

695 Seminar in Health Science. (3-9) Selected literature on current scientific research. Extensive reading in scientific journals. Seminar members report at stated intervals on assigned problems in health science or health science teaching.

Prerequisite: HSC 670; permission of the instructor.

A total of 9 hours of credit may be earned.

697 Special Studies in Health Science. (1-3) Problems of special interest in health science or in health science teaching. Individual work under the

direction of a staff member may involve one or more of the following: experimental work, attendance in undergraduate classes, wide reading, and development of special techniques or skills in scientific investigation.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned, but no more than 3 in any one semester or term.

PHYSIOLOGY (PHYSL)

511 Endocrinology. (3) Endocrine functions in humans and mammals with special emphasis on mechanisms. Normal hormone regulation and pathophysiological principles. Laboratory experience with small-mammal surgery and endocrine testing. One three-hour laboratory period weekly.

Prerequisite: ANAT 201; PHYSL 210, 211; one year of general chemistry.

513 Renal Physiology. (3) Detailed study of the urinary system and excretory functions. Emphasizes human physiology but includes comparative vertebrate systems. Laboratory study includes gross, microscopic anatomy, and small mammal surgery. One three-hour laboratory a week.

Prerequisite: one course each in inorganic chemistry, anatomy, and physiology.

Not open to students who have credit in PHYSL 413.

514 Cardiovascular Physiology. (3) A study of the dynamics of the human cardiovascular system, stressing applications of basic physical principles and the operation of physiological regulatory systems. Includes seminar-style discussion of recent literature.

Prerequisite: one course in physiology.

Not open to students who have credit in PHYSL 414.

515 Physiology of Aging. (3) Study of how physiological systems change with age and the mechanisms that are thought to cause these changes. Disorders and diseases of aging will be covered.

Prerequisite: one course each in inorganic chemistry and physiology.

516 Human Toxicology. (3) Chemical, physical, zoological, and botanical toxicoses in human health. The implications and methodology of

dealing with hazardous substances and poisons.

Prerequisite: CHEM 101 or 111, 112; one year of biology or physiology or combination of both; or permission of the instructor.

Not open to students who have credit in PHYSL 416.

520 Neuroscience. (3) Introductory study of the organization and function of the nervous system. Emphasizes integration of the structure and function of the nervous system.

Prerequisite: one year of chemistry and one year of biology or physiology.

535 Pathophysiology. (3) The physiological pathology of selected disease processes and dysfunctions. The pathogenesis of certain derangements with broad applicability. Underlying chemical, biological, and physical mechanisms. Laboratory experience will include demonstrations, visitations, and specimen study. One three-hour laboratory period weekly.

Prerequisite: one course each in anatomy, physiology, and chemistry.

Not open to students who have credit in PHYSL 435.

585 Research Techniques in Physiology. (3) Introduction to experimental design, laboratory techniques, and data analysis and interpretation in anatomy and physiology. Laboratory will include methods employing animal preparations, modern cellular/molecular techniques, and general histological procedures. Introduction to computer data acquisition and analysis.

Prerequisite: one course in physiology or permission of the instructor; CHEM 563 recommended.

640 Medical Physiology. (8) Summary of human physiology for medical

students. Cellular and organ-system physiology; physiological regulation. Laboratory exercises will demonstrate general principles of physiology and introduce basic techniques and instrumentation.

Prerequisite: admission to the medical education program.

645 Emergency Medicine. (2) Designed to develop an awareness of proper diagnosis and treatment during emergency medical care by professional medical personnel. Fractures; environmental emergencies; injuries to the eye, chest, and abdomen; shock; and wound care.

Prerequisite: admission to the medical education program.

690 Special Studies in Physiology. (1-3) Problems of special interest in physiology or in physiology teaching. Individual work under the direction of a staff member may involve one or more of the following: experimental work, attendance in undergraduate classes, wide reading, and development of special techniques or skills in scientific investigation.

Prerequisite: permission of the department chairperson.

A total of 3 hours of credit may be earned.

SCIENCE (SCI)

501 Electron Microscopy. (3) Introduction to the techniques and theory of electron microscopy. Emphasizes basic procedures employed in the preparation of materials for electron microscopy, preparation of electron micrographs, and operation of the transmission and scanning electron microscopes.

POLITICAL SCIENCE

www.bsu.edu/poli-sci

North Quadrangle 240, (765) 285-8780

Chairperson: Joseph A. Losco

Graduate Advisor in Political Science: Roger Hollands

Graduate Advisor in Public Administration: Roger Hollands

Graduate Faculty: Baker, Chang, Crawley, Frankland, Friedman, Hollands, Losco, Meyer, Morris, Nishikawa, Rouse, Scheele, Vasicko

PROGRAMS

Master of arts (M.A.) in political science, master of public administration (M.P.A.), and master of public administration with a criminal justice and criminology concentration

Admission

Applicants for the master of arts (M.A.) and master of public administration (M.P.A.) programs must meet the admission requirements of the Graduate School, submit Graduate Record Examination (GRE) scores, and be accepted by the Department of Political Science. Students seeking admission to the M.P.A. program with a concentration in criminal justice and criminology must also be accepted by the Department of Criminal Justice and Criminology. Applicants whose undergraduate majors are not political science or closely related subjects may be required to complete undergraduate courses to acquire background knowledge. Credit for these courses does not apply to degree requirements.

MASTER OF ARTS IN POLITICAL SCIENCE

This degree gives students opportunities to broaden and strengthen their understanding of political science. The master of arts in political science prepares students for a variety of goals. Some students may wish to pursue doctoral work at another university after earning the M.A. degree at Ball State University. Some may wish to enter law school; others may seek governmental employment; still others will go into business or professional organizations that require a knowledge of governmental processes. The M.A. degree program is flexible enough to prepare students for such a range of possibilities.

Degree Requirement

Requires a minimum of 30 hours, at least 15 of which must be earned in political science courses at the 600 level. Except in unusual circumstances, the required 600-level courses will include

POLS 625 (Research Methods in Political Science), POLS 642 (Problems in Public Policy), and POLS 648 (Policy Analysis). The university research and writing requirement can be met in one of four ways: a thesis for 6 hours of credit, a research paper for 3 hours of credit, a creative project for either 3 or 6 hours of credit, or satisfactory completion of POLS 626 (Research Seminar).

MASTER OF PUBLIC ADMINISTRATION (M.P.A.)

This degree provides graduate professional education to students who wish to prepare for administrative or research careers in public management at the federal, state, or local government level with nonprofit organizations or private sector corporations extensively involved with government.

The flexibility of the program allows students to tailor an interdisciplinary curriculum to their needs, objectives, and goals. A full-time student can complete the M.P.A. program (including internship) in four semesters or two academic years. An inservice student with a strong background may be able to complete the program with a minimum of one calendar year of course work. The requirements of the program ensure that each student will have a theoretical understanding and practical awareness of public policy and of the principles of management and administration in the public sector. The program blends the study of politics and administration with the techniques of modern management.

To accommodate practitioners and others who have daytime commitments, evening and Saturday morning classes are offered as well as weekday classes. Many opportunities exist for student participation in workshops and experiential learning settings where students and public administrators can interact.

Degree Requirements

| PREFIX | NO | SHORT TITLE | CR | HRS |
|--------|-----|--|----|-----|
| | | M.P.A. with administrative concentration | | |
| POLS | 625 | Research Mth | | 3 |

| | | |
|--|------------------------|-----|
| 15 hours from | | |
| POLS | 642 Public Policy (3) | |
| | 648 Polcy Anyls (3) | |
| | 650 Pub Administ (3) | |
| | 651 Adm Org Mgt (3) | |
| | 652 Personnl Adm (3) | |
| | 653 Pub Fin Adm (3) | 15 |
| Electives in public administration related courses 9-12 | | |
| Research requirement | | |
| POLS | 626 Rsrch Semnar (3-6) | |
| | or | |
| RES | 697 Research Ppr (1-3) | |
| | or | |
| THES | 698 Thesis (1-6) | 3-6 |
| Minor area of study and/or electives in related complementary area 6-9 | | |
| 36-45 hrs | | |
| M.P.A. with criminal justice and criminology (CJC) concentration | | |
| Core area of study | | |
| POLS | 625 Research Mth | 3 |
| 15 hours from | | |
| POLS | 633 Amer Jud Sys (3) | |
| | 642 Public Policy (3) | |
| | 648 Polcy Anyls (3) | |
| | 650 Pub Administ (3) | |
| | 651 Adm Org Mgt (3) | |
| | 652 Personnl Adm (3) | |
| | 653 Pub Fin Adm (3) | 15 |
| CJC concentration | | |
| CJC | 650 Crim Jus Adm | 3 |
| | 651 Intp Rel CJC | 3 |
| | 652 Phil Asp CJC | 3 |
| | 690 Indpen Study | 3 |
| Electives in related area 3-6 | | |
| Research requirement | | |
| POLS | 626 Rsrch Semnar (3) | |
| | or | |
| RES | 697 Research Ppr (1-3) | |
| | or | |
| THES | 698 Theses (1-6) | 3-6 |
| 36-42 hrs | | |

In addition, for both the M.P.A. and the M.P.A. with CJC concentrations, each student is required to have a basic understanding of and ability to deal with introductory accounting. This may be fulfilled by a previous undergraduate accounting course or completion of ACC 501 or the equivalent. The student's plan of study, including electives, will be selected in consultation with the program advisor. Each student's background will be evaluated individually, and recommendations on

program content will be made according to the student's educational and job experiences and career plans. Students without appropriate professional experience will be required to complete for credit (6 hours) a full-time internship.

Interdisciplinary Emphasis

Courses in a number of other departments may be taken as electives to broaden and strengthen the student's training. Selection of such courses must be made in consultation with the major advisor. Students may complete part of their M.P.A. elective courses in such departments as accounting, criminal justice and criminology, economics, journalism, educational leadership, management science, marketing, natural resources and environmental management, physiology and health science, and sociology.

POLITICAL SCIENCE (POLS)

503 Issues in Political Science. (3)

Survey and investigation of a particular topic, problem, or issue in political science with emphasis on subfields, specialties, and materials not covered in other courses. Exact content will be announced before each offering.

Not open to students who have credit in POLS 403.

505 Reading and Special Study. (3-6)

For students whose special aptitudes and interests qualify them to study semi-independently. Topics to be chosen and investigated in consultation with the department chairperson and a professor possessing special competence in the topic involved.

Prerequisite: basic courses in the topic selected for special study.

A total of 6 hours of credit may be earned.

507 Workshop in Political Science. (2-6)

Intensive study of selected problems in political science.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned.

511 American Political Thought. (3)

American political thought from the colonial period to the present. Puritanism, nature of rights, constitutionalism and federalism, nature of the Union, democracy, liberalism, conservatism, individualism and

collectivism, welfare state, isolationism and internationalism, and national security and freedom.

Not open to students who have credit in POLS 411.

512 Early Western Political Thought.

(3) Analysis of political thought of the early Mediterranean and medieval worlds that became the foundation of modern political theories and systems of the West. Emphasizes writings by Plato, Aristotle, Cicero, St. Augustine, St. Thomas Aquinas, and Machiavelli.

Not open to students who have credit in POLS 312.

513 Modern Western Political Thought.

(3) Analysis of selected writings of leading political theorists from the Age of Reformation to the present.

Not open to students who have credit in POLS 313.

527 Voter Polling Techniques. (3)

Methods by which information is acquired on the voting behavior and attitudes of the electorate. Emphasizes producing a working knowledge of polling techniques. Sampling, interviewing, and questionnaire construction.

Not open to students who have credit in POLS 327.

531 Legislation. (3) Legislative bodies and law-making: organization of legislative bodies, operation of the committee system, relations with interest groups, executive branches, bill drafting, legislative aids, controls over legislation, and movement for reform.

Prerequisite: POLS 130 or the equivalent.

Not open to students who have credit in POLS 431.

532 The American Chief Executive. (3)

The American concept of a political chief executive as a coordinate member, with legislature and courts, of a governmental team. Though some consideration of the state governor is involved, major emphasis is on the American presidency as the focal point of national interest, policy initiative, and political mythology.

Prerequisite: POLS 130, 237.

Not open to students who have credit in POLS 432.

534 State Legislatures. (3) Legislative systems in American state government. External influences (constituencies, political parties, interest groups),

internal influences (organizational structure, staff, norms, decision making), issues confronting state legislatures, and reform proposals.

Prerequisite: POLS 130, 237.

535 Intergovernmental Relations. (3)

Analysis of relationships among national, state, and local governments. Consideration of constitutional and legal bases, and the nature of such phenomena as grants-in-aid, tax immunity, education, and interstate compacts.

Prerequisite: POLS 130, 237.

Not open to students who have credit in POLS 435.

537 Government and Politics in Indiana. (3)

Survey of Indiana's political culture and tradition as compared to other states. Critical examination of Indiana's contemporary political processes and governmental policies.

Not open to students who have credit in POLS 437.

538 Metropolitan Problems. (3) Cities and metropolitan communities; the nature, characteristics, functions, governmental structure, intergovernmental relations, social makeup and problems, economic base, decision-making structure, and other related topics; the present and future roles of planning and citizen participation in the entire community.

Prerequisite: POLS 238.

Not open to students who have credit in POLS 438.

540 Introduction to Law and Enforcement. (3)

The development of law and contemporary law enforcement in the United States with special attention to various components of law enforcement systems, their interrelationships, purposes, and needs.

Prerequisite: POLS 130, 237.

Not open to students who have credit in POLS 340.

543 American Constitutional Law. (3)

The Constitution of the United States, its development and interpretations through principal statutes and judicial decisions. Congressional policies embodied in socioeconomic legislation and doctrines developed by the Supreme Court.

Prerequisite: POLS 130.

Not open to students who have credit in POLS 443.

544 Constitutional Liberties. (3)

Relations between the individual and

government as revealed through cases in constitutional law. Cases involving the Bill of Rights and the Fourteenth Amendment.

Prerequisite: POLS 130.

Not open to students who have credit in POLS 444.

545 National Defense Policy. (3) An international survey of military capacity and function as background for analysis of the national defense policy of the United States. Emphasizes American strategic interests and problems of weapons, technology, nuclear control, and disarmament.

Prerequisite: POLS 130.

Not open to students who have credit in POLS 345.

547 Environmental Law and Policy. (3) The legal system's response to conflicting demands upon environmental resources. Composition of environmental problems, control issues, policy formulation, and legal remedies.

Not open to students who have credit in POLS 347.

549 Land-Use Regulation. (3) The legislative and constitutional components of the regulation of land use at various levels of government, including zoning, subdivision regulations, urban renewal, codes, enforcement, eminent domain, conservation, reclamation, interstate compacts, and metropolitan and regional agencies.

Not open to students who have credit in POLS 449.

554 Politics and Administration of Local Government Budgets. (3) Local government budgeting with emphasis on political and administrative issues in budget preparation and accountability. Revenue development from tax and nontax sources, capital expenditure programming, financing pensions, contracting for services, cost/benefit analysis, and federal and state grant mechanisms.

Not open to students who have credit in POLS 454.

555 Administrative Law. (3) Legal and political study of independent regulatory agencies; their powers, functions, and roles as determined by an analysis of relevant cases in which basic principles are identified and synthesized with other elements of public law.

Not open to students who have credit in POLS 455.

561 Community Planning and Its Administration. (3) Planning and development of improved land use and service activities of cities and predominantly urban communities. Consideration of scope, legal basis, implementation, and problems of planning for streets, utilities, education, recreation, transportation, zoning, and related community services.

Prerequisite: POLS 237, 350.

Not open to students who have credit in POLS 461.

565 Labor-Management Relations in Government. (3) Public employee unionization, legal provisions for collective bargaining, determination and recognition of bargaining units, bilateral negotiation, and third-party involvement procedures, administration of agreements, and the processes and strategies in collective bargaining negotiations in public organizations.

Not open to students who have credit in POLS 465.

566 Administrative Problems in State Government. (3) Administrative procedures and organizational behavior at the state level. Emphasizes the provision of government services and functions in budgeting and taxation, education, environmental protection, public health, and public works.

Prerequisite recommended: POLS 237 or 350.

Not open to students who have credit in POLS 466.

570 Public Opinion and Political Behavior. (3) The nature of public opinion, instruments, techniques, and institutions involved in the formation of public opinion; the political uses and implications at home and abroad of public opinion and propaganda.

Not open to students who have credit in POLS 370.

571 Public Interest Groups and Government. (3) The internal government and external political strategy of private associations—trade associations, unions, and professional, church, and patriotic organizations. The implications of pressure group activities for constitutionalism, majoritarianism, and constituency, and the effects of pressure groups upon political parties and the political process.

Not open to students who have credit in POLS 371.

572 Political Campaigns. (3) Political campaigns considered as the linkage between citizens and the government in a representative democracy, from theoretical and practical perspectives. The course will answer questions on the why (theory), what (strategies), and how (techniques) of political campaigns.

Not open to students who have credit in POLS 372.

573 American Political Parties. (3) Organization and functions of political parties in the United States and their role in a representative democracy.

Not open to students who have credit in POLS 473.

574 Women and Politics. (3) National survey of women and the political process, with an emphasis on women and contemporary public policy issues.

Not open to students who have credit in POLS 474.

575 Minority Group Politics. (3) The political effects of ethnic groups on American politics. Emphasizes both legal and extralegal means by which ethnic groups become involved in and influence public policy.

Prerequisite recommended: POLS 130.

Not open to students who have credit in POLS 475.

582 Governments and Politics of Western Europe. (3) Europe as a political and cultural area: the government and political structures of the three major powers in Western Europe—Great Britain, France, and Germany; the current state of the Western European integration movement.

Prerequisite: POLS 130.

Not open to students who have credit in POLS 382.

584 British Government and Politics. (3) The political system of the United Kingdom, including a discussion of the Commonwealth and Britain's place in an expanding European community. Emphasizes Anglo-American relations and British contributions to American political arrangements.

Not open to students who have credit in POLS 384.

585 Politics of the European Union. (3) Study of the development of the European Union as an evolving political entity—its politics, institutions, and policies—and the prospects for European unification.

Not open to students who have credit in POLS 385 or EURO 385.

586 Politics of Russia and the Successor States. (3) Evaluates political, economic, and social change and performance in Russia and the other successor states of the former Soviet Union. Also assesses the historical and cultural context of modern Russia from the Bolshevik Revolution through the post-communist era.

Not open to students who have credit in POLS 386 or EURO 386.

588 Government and Politics of China. (3) A comprehensive survey of the government and politics of modern China, both of the Republic of China and Communist China.

Not open to students who have credit in POLS 488.

589 Comparative Governments. (3) The forms, structures, and processes of governments in the leading nations of the world. Objective comparison of the governments and political institutions of other countries with those of the United States.

Not open to students who have credit in POLS 280.

590 International Law. (3) A survey of the Law of Nations by analyzing prominent decisions of international tribunals, examining representative legal principles, briefing appropriate cases, and conducting mock court trials.

Not open to students who have credit in POLS 490.

592 The United Nations and International Organizations. (3) International organizations; the structure, functions, and current issues facing the United Nations. Students participate in a mock security council at Ball State and may have an opportunity to participate in the National Model United Nations Conference.

Not open to students who have credit in POLS 392.

593 World Politics. (3) Theories of contemporary interactions among states, especially the major powers, with particular attention to conflict resolution.

Not open to students who have credit in POLS 493.

594 International Relations in Asia. (3) Contemporary international relations in Asia with emphasis on the roles of China, Japan, the United States of America, and the former Soviet Union.

Not open to students who have credit in POLS 394.

595 Communist China's Foreign Policy. (3) Communist China's role in international politics, with special emphasis on the effect of Communist China's foreign policy and the response to it.

615 Western Political Theory. (3) In-depth examination of classic works in the Western political tradition including Plato, Aristotle, Aquinas, Machiavelli, Locke, Rousseau, and Marx. Special emphasis on the contributions of each thinker to the evolution of western concepts of justice, liberty, power, and the good society.

625 Research Methods in Political Science. (3) A critical examination of methodological problems and practices in the formulation, execution, evaluation, and reporting of political science research, including a comparison of data-gathering techniques, their respective limitations, and appropriate application.

626 Research Seminar. (3-6) Advanced techniques and applications of political and governmental research. According to need, the seminar will focus on one of the following: traditional political research, behavioral political research, and applied research in policy and administration.

Prerequisite: POLS 625; permission of the department chairperson.

A total of 6 hours of credit may be earned.

633 The American Judicial System. (3) Examines the workings of the American judicial system, composed of courts, judge, jurors, lawyers, spectators, and rules. Topics covered include legal theory, roles of lawyers and judges, judge selection, trial and appellate courts, judicial policy, and the future of law.

642 Problems in Public Policy. (3) Current political, economic, and social problems in the United States. Relationships between government and elements of our free enterprise system, including agriculture, small and large firms, labor, public utilities, and finance.

Prerequisite recommended: POLS 130.

648 Policy Analysis. (3) Equips students with the tools of the policy analyst through systematic analysis of programs and projects. Emphasizes problem definition, goal determination,

systematic evaluation of alternatives, socioeconomic and political indicators, performance measures, and impact evaluation.

Prerequisite recommended: POLS 342 or 642.

650 Public Administration. (3) Organization, personnel, and functions of the various agencies of administration—national, state, and local.

Prerequisite: POLS 130.

651 Administrative Organization and Management. (3) Governmental administrative organizations as companies composed of people taking action under conditions of conflict and cooperation: the nature and role of administrative organization and management, growth and effect on the government of the scientific management movement, formal and informal organization of administrative authority, operational problems and processes, and criteria for evaluation of administration.

Prerequisite recommended: POLS 350.

652 Personnel Administration in Government. (3) The organization and operation of personnel administration in the public service. Scope and character of public employment in the United States, development of federal, state, and local civil service systems, organization of public personnel agencies, and methods and techniques of personnel administration in government.

Prerequisite recommended: POLS 350.

653 Public Financial Administration. (3) Survey of the principles and practices of administration of national, state, and local finances: administrative financial organization, budgetary procedure, accounting of revenues, expenditures, pre-audit and post-audit, assessment and collection of taxes, purchasing, letting of contracts, management of publicly owned undertakings, public debt, and grants-in-aid.

Prerequisite recommended: POLS 350.

669 Paid Internship in American Government. (3-6) Students are paid for part-time or full-time work for one semester in the office of a public official in national, state, or local government, or of a candidate for public office, or of a political party. Assignments depend

upon the interests of students and the convenience of sponsors.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned.

679 Practical Experience in Government. (3-6) Unpaid full or part-time assignment in a public office with

a candidate for public office, a political party, or private organization. Assignments depend upon the student's interest and the convenience of the sponsor.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned.

PSYCHOLOGICAL SCIENCE

www.bsu.edu/psysc

North Quadrangle 104, (765) 285-1690

Chairperson: David Perkins

Coordinator of Graduate Studies: Kerri Pickel

Graduate Faculty: Balogh, Belky, Biner, Butler, Clements, Fischer, Gaither, Holtgraves, Kite, Littleford, Meeker, Meunier, Narter, Perkins, Pickel, Stevenson, Strilto, Summers, Whitley

PROGRAMS

Master of arts (M.A.) degrees in clinical psychology and in cognitive and social processes

Admission

Applicants must meet the admission requirements of the Graduate School; have an undergraduate grade point average of at least 3.0 on a 4.0 scale; have a Graduate Record Examination combined verbal and quantitative score of at least 1000; submit three letters of reference, transcripts of all previous graduate and undergraduate course work, and departmental applications; and have taken undergraduate courses in psychology that include experimental design and methodology and statistics.

MASTER OF ARTS IN CLINICAL PSYCHOLOGY

A two-year program designed to provide training consistent with that expected of a scientist-practitioner clinical psychologist. Students may elect a program of study consistent with preparation for licensure as a master's-level mental health counselor.

Degree Requirements

| <i>PREFIX</i> | <i>NO</i> | <i>SHORT TITLE</i> | <i>CR HRS</i> |
|--|-----------|--------------------|---------------|
| Clinical requirements | | | |
| PSYSC | 632 | Abnormal | 3 |
| | 640 | Assessmnt 1 | 3 |
| | 644 | Assessmnt 2 | 3 |
| | 652 | Intr Psythrp | 3 |
| | 653 | Adv Psythrp | 3 |
| | 682 | Prof Orn/Cln | 1 |
| | 685 | Clinical Int (3-6) | 6 |
| | | | ----- |
| | | | 22 hrs |
| Psychology core requirements | | | |
| PSYSC | 616 | Percp Cognit (3) | |
| | | or | |
| | 623 | Theor Persnl (3) | 3 |
| | 668 | Physiological | 3 |
| | 680 | Res Meth Psy | 3 |
| | 681 | Prof Orientn | 1 |
| | 691 | Systems | 3 |
| | 696 | Sem Divrsity | 3 |
| EDPSY | 642 | Interim Stats | 3 |
| | | | ----- |
| | | | 19 hrs |
| Additional requirement | | | |
| Approved electives by the graduate program director and/or RES 697 or THES 698 | | | |
| | | | 7 |
| | | | ----- |
| | | | 48 hrs |

PSYSC 623 is required if no undergraduate personality course was taken. The university research and writing requirement is met by PSYSC 680 and EDPSY 642.

All graduate courses in psychological science are required to include diversity as a course objective.

MASTER OF ARTS IN COGNITIVE AND SOCIAL PROCESSES

A two-year program designed to provide extensive training in social and cognitive psychology, research methods, and statistics.

Degree Requirements

| PREFIX | NO | SHORT TITLE | CR | HRS |
|---|-----|---------------|-----------|-----|
| Clinical requirements | | | | |
| PSYSC | 616 | Percp Cognit | 3 | |
| | 617 | Memor | 3 | |
| | 618 | Thinking | 3 | |
| | 623 | Theor Persnl | 3 | |
| | 680 | Res Meth Psy | 3 | |
| | 681 | Prof Orientn | 1 | |
| | 691 | Systems | 3 | |
| | 696 | Sem Divrsty | 3 | |
| EDPSY | 642 | Interim Stats | 3 | |
| SOPSY | 610 | Social | 3 | |
| | 615 | Social Cog | 3 | |
| | 660 | Contemporary | 3 | |
| Electives (general) | | | 6-12 | |
| THES 698 or RES 697 or elective approved by Graduate Program Director | | | 3-6 | |
| | | | 43-46 hrs | |

The university research and writing requirement can be met by PSYSC 680 and EDPSY 642. All graduate courses in psychological science address diversity as one of the course objectives. PSYSC 691, SOPSY 610 may be waived if equivalent undergraduate course(s) taken.

Internship Placement

The department maintains a training agreement with local community mental health agencies, hospitals, and the university Counseling and Psychological Services Center. Clinical students complete an internship (minimum 400 hours) at one of these facilities during their second year. Students preparing for licensure as a master's-level counselor should complete CPSY 606 plus 600 hours in PSYSC 685 and 300 hours in PSYSC 687.

Teaching and Research Assistantships

Approximately 65 percent of students are awarded assistantships and partial fee remissions. In return, students help faculty instructors or assist in faculty research. Exceptional second-year students may be offered the opportunity to teach introductory-level classes.

Interdepartmental Cooperative Arrangements

The department maintains a cooperative teaching and research arrangement with the counseling psychology and educational psychology departments for maximum flexibility in training. In addition, the department is involved in the university's Fisher Institute for Wellness and Gerontology.

PSYCHOLOGICAL SCIENCE (PSYSC)

524 Psychology of Women. (3)

Psychological approaches to the study of women with special emphasis on achievement motivation and dependency, attitudes toward women, development of sex-role identity, biological and social influences on women's behavior, self-concepts and psychological conflict in women, and a critical appraisal of research in sex differences.

Not open to students who have credit in PSYSC 324.

573 Industrial Psychology. (3)

Application of psychological principles to personnel selection and training, worker motivation and satisfaction, leadership, engineering psychology, and personnel problems in industry.

Not open to students who have credit in PSYSC 373 or equivalent.

574 Organizational Development: A Psychological Perspective. (3)

Examines organization change and development techniques from the perspective of psychological theory and research. Emphasizes individual and team level interventions.

Prerequisite: any one of PSYSC 373, 573; MGT 300, 500; or equivalents, or permission of the instructor.

Not open to students who have credit in PSYSC 474 or equivalent.

575 Psychology of Selection and Placement. (3)

Principles of personnel testing as applied to the selection and placement process. Focuses on the development of predictors and criteria, selection of an appropriate validation

model, and the psychological dynamics of interview processes.

Prerequisite: PSYSC 373, 573, or permission of the department chairperson.

584 Experimental Psychology. (3) The study of behavior by the experimental method. Experimental studies will be conducted to evaluate research techniques and appropriate controls.

Prerequisite: PSYSC 241 or EDPSY 641.

Not open to students who have credit in PSYSC 284.

595 Special Topics in Psychology. (3) Investigation of various topics related to psychology. Topics will vary at the discretion of the instructor.

Prerequisite: permission of the department chairperson.

613 Developmental Psychology. (3) Concepts, principles, theories, and research concerning the biological and environmental influences on behavioral and psychological development.

Emphasizes issues and topics related to the normal human life span. Designed primarily for students without undergraduate work in human growth and development.

Prerequisite recommended: PSYSC 241 or the equivalent.

615 Learning and Motivation. (3) Analysis of research and theories of basic conditioning, learning processes, and motivation. Biological bases of motivation will also be considered. The major concentration will be on animal learning and motivation, but parallels to human behavior will be drawn.

Prerequisite: PSYSC 284 or 584.

616 Perception and Cognition. (3) Analysis of research and theories of perception, cognition, and language. Covers information processing, attention, verbal learning and memory, problem solving, concept formation, and psycholinguistics.

Prerequisite: PSYSC 284 or 584.

617 Memory Processes and Applications. (3) Explores models of human memory processes, as well as biological, environmental, and social factors affecting memory.

Prerequisite: PSYSC 616.

618 Thinking. (3) Examines psychological theories, models, research, and applications of problem solving, decision making, reasoning,

and other kinds of intelligent human cognitive processing.

Prerequisite: PSYSC 616.

619 Psychology of Language. (3) A review of research on the psychological processes involved in the comprehension and production of language. Topics include sentence and discourse processing, pragmatics, conversation structure, representation and meaning, language and thought, and language acquisition.

Open only to graduate students in Psychological Science, English, Communication Studies, or Speech Pathology and Audiology.

623 Theories of Personality. (3) Review and comparison of theories of the structure, development, dynamics, and assessment of normal personality, with emphasis on empirical data presented by proponents of various theoretical positions.

Prerequisite recommended: PSYSC 241.

632 Abnormal Psychology. (3) Introduction to adult psychopathology with emphasis on contemporary systems of classification of behavior disorders, expression of behavior disorders in the context of cultural factors, problems associated with diagnostic decision making, and current research concerning descriptive boundaries, etiology, course, and prognosis.

Prerequisite: PSYSC 284; permission of the department chairperson.

Prerequisite recommended: PSYSC 317.

Open only to students in the clinical M.A. program.

640 Introduction to Psychological Assessment. (3) Theoretical and practical implications of psychodiagnostic tools including age, gender, ethnicity, language, disability, and culture factors related to the assessment and evaluation of individuals and groups. Emphasizes issues of reliability, validity, and ethics, plus the development of basic diagnostic skills.

Prerequisite: PSYSC 623, 632.

Open only to students in the clinical M.A. program.

641 Psychodiagnostic Aspects of Intellectual Dysfunction. (3) A seminar dealing with the origins, patterns, and problems of assessing psychodiagnostic aspects of intellectual or cognitive dysfunction.

Prerequisite: PSYSC 632, 640.

644 Advanced Psychological Assessment. (3) Continuation of PSYSC 640 with emphasis on the selection, administration, interpretation, and use of objective and projective personality assessment devices in conjunction with other techniques. Emphasizes development of advanced diagnostic skills and ethical considerations.

Prerequisite: PSYSC 623, 632, 640.

652 Introduction to Psychotherapy. (3) Introduction to treatment of abnormal behavior using individual psychotherapy. Selected theories and techniques are surveyed. Emphasizes development of basic therapeutic skills, therapist and client characteristics that influence helping processes, ethical considerations, and implications of sociocultural, demographic and lifestyle diversity.

Prerequisite: permission of the department chairperson.

653 Advanced Topics in Psychotherapy. (3) Selected topics in psychotherapy and related interventions are examined, including crisis intervention, medications, prevention, and community intervention. Also covered are historical, legal, financial, and ethical considerations, procedures for determining accountability, and public policy issues related to mental health services.

Prerequisite: PSYSC 632, 652; permission of the instructor.

Open only to students in the clinical M.A. program.

668 Physiological Psychology. (3) Introduction to the physiological basis of behavior, involving the nervous system, its structure, biochemistry, and function. Emphasizes basic neuroscience and research methods. Includes a survey of the role of neurophysiology and neuroanatomy in functions of consciousness and mental disorders.

Prerequisite: PSYSC 284, 584.

670 Health Psychology. (3) A systematic introduction to the use of psychological procedures in the prevention, diagnosis, and treatment of such medical problems as cardiovascular disorders, headaches, obesity, asthma, and chronic pain.

Prerequisite: PSYSC 632.

680 Research Methods in Psychology. (3) Overview of research methods in psychology, including experimental, quasi-experimental, correctional, single

case, and program evaluation techniques.

Prerequisite: PSYSC 241, 284, or their equivalents; permission of the instructor.

681 Orientation to Professional Psychology. (1) Introduces research and professional work conducted in psychology. Psychological science faculty discuss issues such as educational programs, professional training, clinical practice, methodology, and development of research ideas.

682 Orientation to Professional Clinical Psychology. (1) Introduces professional practice in clinical psychology, including history, roles, organizational structure, ethics, standards, and credentialing.

Open only to clinical graduate students in psychological science or by permission of the department chairperson.

685 Clinical Internship. (3-6) Supervised applied clinical experience in one or more appropriate settings. Students must have earned 20 hours of graduate credit in psychological science, at least half of which should be from the clinical sequence.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned.

Open only to students in the clinical M.A. program.

686 Applied Practicum. (3-6) Supervised experience in an applied setting.

Prerequisite: 21 hours of graduate credit in psychology; permission of the department chairperson.

A total of 6 hours of credit may be earned.

Open only to master's candidates in cognitive and social processes.

687 Advanced Clinical Internship. (3) Supervised advanced clinical experience in one or more appropriate settings. Emphasizes the development of advanced skills, the integration of professional knowledge, and skills appropriate to professional practice.

Prerequisite: PSYSC 685.

Open only to students in the clinical M.A. program.

691 Systems of Psychology. (3) The major concepts of various schools of psychological thought and

contemporary theoretical systems as they have evolved from their historical origins.

695 Seminar in Psychology. (1-3) Investigation in the current literature of psychology. Topics will vary each semester, at the instructor's discretion.

Prerequisite: 12 hours of graduate credit in psychology.

A total of 3 hours of credit may be earned.

696 Seminar on Diversity. (3) Introduces the application of diversity perspectives to psychological research and practice. Race, ethnicity, economic status, national origin, disability, gender, sexual identity, age, and religious beliefs will be considered. Emphasizes why all psychological subdisciplines need to understand diversity issues.

Prerequisite: permission of the instructor.

698 Psychological Investigations. (1-3) For students with special aptitude: an opportunity to pursue a line of psychological investigation individually under faculty supervision. Students will be expected to read the relevant literature and to participate in designing and conducting the investigation. Time spent in the investigation may vary from one semester to a full academic year, sometimes including the summer.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned, but no more than 3 in any one semester or term.

SOCIAL WORK

www.bsu.edu/socwk

North Quadrangle 108, (765) 285-1016

Chairperson: Harry J. Macy

Graduate Faculty: Dolon, Macy, Patchner

SOCIAL WORK (SOCWK)

570 Selected Aspects of Social Work Practice. (3 or 6) Exploration of social work practice with selected client populations and types of practice with emphasis on individualized study, reporting, and group discussion. Study will focus on social work practice and social service delivery within the identified field.

A total of 12 hours of credit may be earned, but no more than 6 in any one semester or term.

Not open to students who have credit in SOCWK 370.

575 Social Welfare Policy with the Elderly. (3) The course is concerned with the major social welfare policies that affect the elderly. Focus will be on problems of the elderly and social welfare policies and programs directed at the reduction of such problems.

Prerequisite: SOC 431, 531.

SOCIOLOGY

www.bsu.edu/sociology

North Quadrangle 205A, (765) 285-5977

Chairperson: Roger A. Wojtkiewicz

Graduate Advisor: Ione DeOllos

Graduate Faculty: Blakely, DeOllos, Johnson, Kapinus, Messineo, Pellerin, Wojtkiewicz

PROGRAM

The master of arts (M.A.) in sociology is designed to prepare students for professional employment or doctoral study in sociology at other universities.

MASTER OF ARTS IN SOCIOLOGY

Admission

Applicants must meet the admission requirements of the Graduate School, take the Graduate Record Examination (GRE), and present evidence of preparation to do work in sociology.

Degree Requirements

The master of arts in sociology requires 33 hours. Students must complete a 15-hour core of required courses. To complete the remaining 18 hours, students will choose the following options, depending on their needs and backgrounds: research paper or thesis, minor, and/or electives. Students who do not have credit in SOC 402 or the equivalent will be required to take SOC 502 as an elective. The department strongly encourages students to consider writing a thesis as part of elective credit. The research methodology course requirement is met by SOC 681.

| <i>PREFIX</i> | <i>NO</i> | <i>SHORT TITLE</i> | <i>CR</i> | <i>HRS</i> |
|---|-----------|--------------------|-----------|------------|
| Core Requirements | | | | |
| SOC | 503 | Readings | 3 | |
| | 582 | Statistics | 3 | |
| | 600 | Soc Inquiry | 3 | |
| | 681 | Suvery | 3 | |
| | 684 | Data Analys | 3 | |
| Elective | | | | |
| In addition to required courses, the sociology department strongly encourages students to complete one of | | | | |

| | | | | |
|-----|-----|-------------|---|--|
| SOC | 503 | Readings | 3 | |
| | 582 | Statistics | 3 | |
| | 600 | Soc Inquiry | 3 | |
| | 681 | Suvery | 3 | |
| | 684 | Data Analys | 3 | |

the following research options (thesis is preferred)

| | | | |
|------|-----|----------------------|--------|
| RES | 697 | Research Ppr (1-3) | |
| | | or | |
| THES | 698 | Thesis (1-6) | 0-6 |
| | | Minors and electives | 12-18 |
| | | | 33 hrs |

Graduate Assistantships

A limited number of graduate assistantships are available each year to students who have maintained a minimum undergraduate grade point average of 2.75 on a scale of 4.0. There is a stipend, and part of the tuition is waived. Graduate assistants should plan for and expect assistantships to begin in the fall semester and end at the close of the spring semester. Renewal of the assistantship for a second year is available.

SOCIOLOGY (SOC)

502 Sociological Theory. (3) Focuses on sociological theories of the nineteenth and early twentieth centuries. The investigation includes the intellectual and cultural backgrounds from which theories developed.

Not open to students who have credit in SOC 402.

503 Readings in Sociological Theory. (3) Focuses on the reading and in-depth study of significant contemporary sociological works.

Prerequisite: SOC 502 or equivalent.

520 Social Inequality. (3) Examines causes and consequences of social class, status, and mobility in the United States and other countries.

Not open to students who have credit in SOC 320.

521 Racial and Cultural Minorities in the United States. (3) Examines the causes of prejudice and discrimination toward minorities in the United States, minority group experiences, and proposals for reducing prejudice and discrimination.

Not open to students who have credit in SOC 421.

522 Social Trends in Contemporary Societies. (3) Analysis of social trends in contemporary societies.

Not open to students who have credit in SOC 422.

523 Industrial and Post-Industrial Society. (3) Examines the social effects of the Industrial Revolution and Post-Modernity, the continuing importance of technological change, social structures of industrial organizations, and expansion of the service and health sectors.

Not open to students who have credit in SOC 423.

527 Sociology of World Religions. (3) Study of the relationship between society and religion.

Not open to students who have credit in SOC 427.

528 Globalization and Third-World Societies. (3) Examines developmental and globalization trends in third-world societies. The effects of industrialization, mass media, population growth, rapid urbanization, and pressures from other societies are also examined.

531 Social Gerontology. (3) Examines the effects of social and cultural factors of the aging process including an analysis of policies and programs designed to meet the needs of older adults.

Not open to students who have credit in SOC 431.

537 Global Inequality. (3) Examines social inequalities linked to race, ethnicity, gender, religion, and other conditions occurring worldwide.

541 Social Change. (3) Analyzes social movements and resistance to these movements.

Not open to students who have credit in SOC 441.

570 Population and Demography. (3) Investigates contemporary demographic patterns and their implications for the future. Issues of composition, distribution, and growth of human populations are addressed.

Not open to students who have credit in SOC 470.

572 Urban Dynamics and Problems. (3) Examines the historic functions and institutional dynamics of the city with special reference to contemporary urban problems, including issues of community diversity and solidarity.

Not open to students who have credit in SOC 472.

574 Seminar on Middletown Studies. (3) Focuses on two works by the Lynds, "Middletown" and "Middletown in Transition," and more recent studies about Muncie, Indiana. Includes participation in a continuing sociological project.

580 Sociological Research Design. (3) Examines the basic principles of conducting and analyzing sociological research.

Not open to students who have credit in SOC 280.

582 Social Statistics. (3) Calculation, application, and interpretation of statistics used in social and behavioral sciences.

583 Evaluation and Qualitative Research. (3) Examines the nature of evaluation and qualitative research methodology. Provides experience in proposal writing as well as evaluation design and implementation.

Not open to students who have credit in SOC 483.

588 Internship 3: Field Experience. (1-3) Unpaid supervised field experience in a business, industrial, governmental, educational, or other setting. Supervision will be jointly provided by sociology faculty and employers.

Prerequisite: permission of the sociology internship coordinator and the department chairperson.

A total of 6 hours of credit may be earned, but no more than 3 in any one semester or term.

590 Independent Study in Sociology. (1-3) Topics to be chosen and investigated in consultation with an instructor possessing special competence in the subject involved.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned, but no more than 3 in any one semester or term.

600 Sociological Inquiry. (3) Examines the nature of sociology, types of research data, and the formulation and reporting of sociological research. Focuses on the preparation of research proposals.

644 Family and Gender. (3) Comparative perspectives on the historical transformations that have influenced family and gender relationships are considered. Cultural variations will be evaluated as they relate to social problems and policy initiatives.

664 Advanced Seminar in Social Gerontology. (3) Examines the sociological components of aging as an increasingly significant social phenomenon in contemporary American society.

Prerequisite: SOC 531 or equivalent.

669 Internship 2: Paid Field Work. (3) Paid supervised field experience in a public agency or business setting. Training involves data analysis, evaluation research, and implementation of agency programs

under the supervision of the employer and the department.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned, but no more than 3 in any one semester or term.

681 Survey Research Methods. (3) Provides practical knowledge on how to develop and conduct surveys.

684 Advanced Sociological Data Analysis. (3) Selection and use of advanced statistical techniques for analyzing sociological data. Topics include multiple regression and other multivariate models.

Prerequisite: SOC 582.

699 Seminar in Selected Topics in Sociology. (3) Explores selected topics relevant to the discipline of sociology providing a critical evaluation from a variety of perspectives. Students may not repeat topics for additional credit.

A total of 6 hours of credit may be earned, but no more than 3 in any one semester or term.

SPEECH PATHOLOGY AND AUDIOLOGY

www.bsu.edu/spaa

Arts and Communications Building 104, (765) 285-8162

Chairperson: Mary Jo Germani

Graduate Advisor for Speech Pathology: Mary Jo Germani

Graduate Advisor for Audiology: Mary Jo Germani

Graduate Faculty: Coffin, Condon, Germani, Hemeyer, Houk, McClain, Ross, Thatcher, Thornburg, Updike, Wagner

PROGRAMS

Master of arts (M.A.) in speech-language pathology and doctor of audiology (Au.D.)

Admission

Applicants must meet the admission requirements of both the Graduate School and the program in the Department of Speech Pathology and

Audiology and must submit transcripts of grades from completed bachelor's degree programs (including all schools attended at the undergraduate or graduate level), three letters of recommendation, and Graduate Record Examination scores. Applicants to the doctor of audiology degree program must also submit a statement of purpose and complete an interview.

MASTER OF ARTS IN SPEECH-LANGUAGE PATHOLOGY

Program is accredited by the Council on Academic Accreditation (C.A.A.) in Audiology and Speech-Language Pathology. The master's degree is a basic requirement for employment as a certified and licensed speech-language pathologist. Graduate study in speech-language pathology includes the academic and practicum requirements needed for Indiana School Services Personnel certification, as well as Indiana state licensure and the Certificate of Clinical Competence (C.C.C.) awarded by the American Speech-Language-Hearing Association (A.S.H.A.). To qualify for the state licensure or the Certificate of Clinical Competence, students must pass a national examination and demonstrate adequate clinical skills during a Clinical Fellowship Year (C.F.Y.) of supervision by a certified speech-language pathologist.

Admission

- Students must be admitted to both the department and to the Graduate School to enroll as a degree student.
- Minimum grade point average of 3.0. We receive more qualified applicants than we can accept; meeting or exceeding this average does not guarantee admission.
- Prefer a combined score of 900 on the verbal and quantitative sections of the GRE
- Three letters of reference (on department forms).
- Transcripts of all previous graduate and undergraduate coursework.
- Completed graduate school application.

Degree Requirements

The master's program in speech-language pathology has a strong clinical orientation. Extensive practicum work with close supervision is required and is considered to be a critical component of the program.

For people with backgrounds in speech and hearing (usually bachelor's degrees), the program consists of a minimum of 62 semester hours including courses in which clinical practicum experience is acquired. For persons who have an undergraduate major in speech and hearing, the program usually takes six consecutive semesters to complete.

The program requires sufficient clinical practicum hours to meet the American Speech-Language-Hearing Association's clinical practicum requirements. A comprehensive examination is also required.

People with no background in speech and hearing but who have bachelor's degrees must take undergraduate deficiency classes before the regular graduate program can begin. The length of such programs will vary, but they typically take nine consecutive semesters.

Course requirements include the following:

| <i>PREFIX</i> | <i>NO</i> | <i>SHORT TITLE</i> | <i>CR</i> | <i>HRS</i> |
|---------------|-----------|---------------------------|-----------|------------|
| SPAA | 601 | Intro Resrch | | 3 |
| | 610 | Child Lang 1 | | 3 |
| | 611 | Child Lang 2 | | 3 |
| | 620 | Dx Cl Pract (1-2) | | 2 |
| | 621 | Artic Dis 2 | | 3 |
| | 622 | Fluency | | 3 |
| | 624 | Diagnostics (2-4) | | 4 |
| | 625 | Voice | | 3 |
| | 628 | Ad Clin Prac (2-10) | | 6 |
| | 629 | Prof Issues | | 2 |
| | 631 | Aug Alt Comm | | 3 |
| | 632 | Neurogens 1 | | 3 |
| | 633 | Neurogens 2 | | 3 |
| | 635 | Diversity | | 2 |
| | 637 | Atypical Pop | | 2 |
| | 640 | Dysphagia | | 3 |
| | 642 | Aud for S L P | | 2 |
| | 690 | Sem S L Path (1-6) | | 6 |
| | 693 | Internship (3-9) | | 3 |
| | 695 | Sch Intern (3-9) | | 3 |
| | | Comprehensive examination | | 0 |
| | | | | 62 hrs |

Approved graduate courses in other departments may be substituted for SPAA 690.

DOCTOR OF AUDIOLOGY (Au.D.)

The doctor of audiology degree is a post-baccalaureate degree designed to prepare students for the professional practice of audiology. The program is accredited by the Council of Academic Accreditation in Audiology and Speech-Language Pathology (CAA) and meets requirements for Indiana state licensure. The typical program is four calendar years. The first three years include academic study and intense supervised clinical practicum both on and off-campus. The final year consists of a 12-month externship at an approved audiologic facility.

Admission

Applicants must meet the admission standards of the Graduate School and the Department's Au.D. Admissions Committee. The committee's decision is based on several factors, including the applicant's undergraduate transcripts, Graduate Record Examination scores, written recommendations, a written statement of purpose, and an interview. Admission to the program is competitive and meeting admission requirements does not ensure admission. Preference is given to applicants with undergraduate grade point averages of 3.2 or higher (on a 4.0 scale) and GRE scores of 500 or higher in the verbal and quantitative sections. Per Graduate School requirements, students admitted to the program are required to maintain a 3.2 grade point average or higher throughout their Au.D. program to remain in good academic standing. Applicants admitted to the program may be required to take undergraduate courses to acquire needed background knowledge if any areas of deficiency in undergraduate preparation are identified. Often, any needed deficiency courses can be taken during the Au.D. program without extending the length of the program; however, credit for these deficiency courses does not apply toward the Au.D. degree requirements.

Requirements

Degree requirements include a total of 100 credit hours (73 academic credit hours, 18 clinical practicum credit hours, and 9 externship credit hours). Students must accumulate a minimum of 800 practicum hours and complete a 12-month audiologic externship during their final year of study. Students must pass comprehensive examinations and successfully pass a national audiology examination during their last year of on-campus study, prior to externship placement. Academic and clinical course requirements include:

| PREFIX | NO | SHORT TITLE | CR HRS |
|--------|-----|-----------------|--------|
| SPAA | 519 | Practicum (1-4) | 2 |
| | 562 | Neuro Anat | 3 |
| | 601 | Intro Resrch | 3 |
| | 643 | S L P for Aud | 2 |
| | 648 | Hearing Anat | 4 |
| | 650 | Ped Aud | 3 |
| | 651 | Aud Prob Adl | 3 |
| | 652 | Psychoacoust | 3 |
| | 653 | Meas Vestib | 2 |

| | | |
|-----------|-------------------|---------|
| 654 | Evkd Pot Tst | 3 |
| 655 | Diagn Audiol | 3 |
| 656 | Spch Hrg Aid | 4 |
| 657 | Adv Diag Aud | 3 |
| 658 | Private Prac | 2 |
| 659 | Industrial | 1 |
| 660 | Otoac Emiss | 1 |
| 661 | Cochlr Impl | 2 |
| 662 | Pharm Aud | 2 |
| 663 | Counsel Aud | 1 |
| 664 | Hstry/Issues | 1 |
| 692 | Dir Studies (1-3) | 1 |
| 749 | Audiol Prac (1-4) | 18 |
| 766 | Hear Aid 2 | 3 |
| 770 | Clin Rounds | 2 |
| 771 | Clin Project | 1 |
| 793 | Aud Extern (3) | 9 |
| SNLNG 551 | Sign Lang 1 | 3 |
| Electives | | 15 |
| | | 100 hrs |

SPEECH PATHOLOGY AND AUDIOLOGY (SPAA)

500 Survey of Speech-Language Pathology and Audiology. (2)

Introduction to speech-language pathology and audiology and a survey of communication disorders. Particularly helpful for persons thinking about careers in communication disorders or in related fields (teaching, nursing, gerontology, etc.).

Not open to students who have credit in SPAA 100.

518 Organic Speech and Language Disorders. (3) An overview of speech and language disorders resulting from organic problems. Areas covered include cerebral palsy, aphasia, cleft palate, dysphagia, vocal abuse, head trauma, and laryngectomy.

Prerequisite: SPAA 161; permission of the department chairperson.

Not open to students who have credit in SPAA 418.

519 Speech Pathology and Audiology Practicum. (1-4) Students engage in observation and preprofessional participation with clients with various speech, language, and hearing disorders.

Prerequisite: SPAA 210, 311.
A total of 4 hours of credit may be earned.

Not open to students who have 4 hours of credit in SPAA 319.

542 Audiology for Deaf Education. (3) Overview of audiology and aural rehabilitation for deaf-education majors.

Prerequisite: SPAA 101 or COMM 216; SPCED 240 or 540.

Not open to the students who have credit in SPAA 342.

Open only to deaf-education majors or by permission of the department chairperson.

543 Introduction to Audiology. (3)

Overview of the anatomy and physiology of hearing, hearing disorders, and hearing assessment, hearing screening.

Prerequisite: SPAA 161, 260 or 560.

Not open to students who have credit in SPAA 343.

544 Aural Rehabilitation. (3) Overview of aural rehabilitation. Practical implications of various types of hearing losses and appropriate rehabilitative procedures. Amplification, auditory training, speechreading, educational and vocational considerations, and psychosocial implications of hearing loss.

Prerequisite: SPAA 210, 270, 343; or permission of the department chairperson.

Not open to students who have credit in SPAA 344.

545 Clinical Audiology: Orientation and Visitation. (2) Orientation to the practice of clinical audiology in various settings and work environments.

Prerequisite: permission of the department chairperson.

Not open to students who have credit in SPAA 345.

Open only to Au.D. students.

560 Speech Acoustics. (3) Introduction to the physical nature of speech and its relationship to speech production and perception.

Prerequisite: SPAA 101, 161.

Not open to students who have credit in SPAA 260.

562 Neuroanatomy and Neurophysiology of Speech, Language, and Hearing. (3) Overview of neuroanatomy and neurophysiology with a concentration on neurological mechanisms related to speech, language, and hearing.

Prerequisite: SPAA 161.

Not open to students who have credit in SPAA 361.

Open only to Au.D. students.

569 Child Language Disorders 1. (3) Introduction to the nature, cause, and treatment of language disorders in children.

Prerequisite: SPAA 270 or 570.

Not open to students who have credit in SPAA 371.

Open only to Au.D. students.

570 Language Development. (3)

Overview of language and language development. Consideration of phonology, morphology, syntax, and semantics. Theories of language acquisition. Cultural diversity as related to language.

Not open to students who have credit in SPAA 270.

601 Introduction to Research in Speech Pathology and Audiology. (3)

Orientation to research in speech-language pathology and audiology. Develops the abilities to read, evaluate, apply, and conduct research. Includes research writing style, critical reading, literature searches, research design, basic statistics, and computer applications.

Prerequisite: permission of the department chairperson.

610 (671) Child Language: Birth to Five. (3)

Emphasis on profiling the language and communication characteristics of various populations (e.g., neonates, autism spectrum disorders, specific language impairment) of young children seen in SLP. Contemporary assessment and intervention practices are reviewed, pertinent to evaluating the efficacy of communication treatment through participation and quality of life outcomes.

Prerequisite: SPAA 371 or equivalent; permission of the department chairperson.

611 Child Language: School Age to Adolescent. (3)

Emphasizes communicative competency at the narrative and conversational levels of children with Language-Learning-Disabilities (LLD). Applied clinical service delivery models (e.g., curriculum-based-instruction) are reviewed, pertinent to promoting oral language through literacy based assessments and interventions. Various reading disorders (e.g., Dyslexia) are discussed when attributed to language impairments.

Prerequisite: SPAA 610; permission of the department chairperson.

620 Diagnostic Clinical Practicum. (1-2)

Supervised clinical practice in assessment strategies, collecting clinical data, client interviewing, counseling,

preparation of reports, and referral procedures.

Prerequisite: SPAA 319 (3 enrollments) or equivalent and permission of the department chairperson.

A total of 2 hours of credit may be earned.

Open only to SPAA graduate students.

621 Disorders of Articulation and Phonology 2. (3) Advanced study of pediatric articulation and phonologic disorders. Survey of modern approaches to phonologic analysis and intervention techniques emphasizing critical review of the professional literature in its historic context. Overview of single-subject designs and accountability procedures.

Prerequisite: SPAA 210 or its equivalent.

622 Fluency. (3) Nature, symptoms, development, diagnosis, and treatment of dysfluency. Overview of research and theoretical formulations regarding dysfluency and its treatment. Case studies of treatment programs through video demonstrations.

Prerequisite: permission of the department chairperson.

624 (623) Diagnosis and Appraisal 2. (2-4) Emphasis on the evaluation of communication disorders across the life span with diverse populations. Psychometric properties of norm-referenced and criterion-referenced tests are reviewed in relationship to assessment practices in SLP. Alternative assessment models are introduced, which provide functional and meaningful data for the diagnosis and treatment of communication disorders.

Prerequisite: SPAA 312 or equivalent; permission of the department chairperson.

A total of 4 hours of credit may be earned.

625 Voice Disorders. (3) Functional and organic voice disorders; normal vocal physiology; diagnosis and evaluation of and therapy for vocal disorders. Harshness, nasality, and other common problems, along with management of disorders related to laryngectomy and cleft palate.

Prerequisite: permission of the department chairperson.

628 Advanced Clinical Practice. (2-10) Students diagnose and treat children and adults with speech and/or

language disorders. Ordinarily a total of 6 hours of credit is earned during three enrollments.

Prerequisite: SPAA 319 (3 enrollments) or the equivalent; SPAA major, and permission of the department chairperson.

A total of 10 hours of credit may be earned.

Open only to graduate students majoring in speech-language pathology.

629 Professional Issues in Speech-Language Pathology. (2) Overview of professional issues facing clinicians. Examines ethical, multicultural, and service delivery issues in a variety of work settings with clients across the lifespan. Also reviews certification, licensure, health care and education legislation and regulation. Employment and internship opportunities and issues are discussed.

Prerequisite: permission of the department chairperson.

631 Augmentative/Alternative Communication and the Nonvocal Individual. (3) Needs assessment and communication evaluation considerations; selection and development of appropriate and effective augmentative/alternative communication systems for nonvocal people including communication boards, electronic instrumentation, etc. Program development for individual needs and abilities of clients.

632 (627) Neurogenic Disorders 1. (3) Advanced study of the central nervous system and its relationship to the causes, assessment and management of aphasia, right hemisphere dysfunction, and associated motor speech disorders.

Prerequisite: SPAA 161, 361 or equivalents; permission of the department chairperson.

633 Neurogenic Disorders 2. (3) Advanced study of the nature, causes, assessment, and management of dementia and traumatic brain injuries. Includes the study of normal aging and cognitive functions.

Prerequisite: SPAA 632; permission of the department chairperson.

635 Cultural and Diversity Issues in SLP. (2) Examines multicultural and diversity issues facing the speech-language pathologist. Addresses the need for cultural competence, culturally informed assessment and instructional strategies, and the possible needs and

strengths of culturally and linguistically diverse populations.

Prerequisite: permission of the department chairperson.

Open only to SPAA graduate students.

637 Clinical Approaches to Atypical Populations. (2) Advanced orientation to clinical populations of children with atypical language development (i.e., mental retardation, cerebral palsy) is reviewed. Assessment and intervention practices are introduced from a theoretical and applied perspective, pertinent to the specific etiologies of atypical language disorders.

Prerequisite: permission of the department chairperson.

Open only to SPAA graduate students.

640 Dysphagia. (3) Introduction to dysphagia with emphasis on knowledge needed to evaluate and treat adults with swallowing disorders. Current trends and issues will be studied. Normal and disordered swallowing across lifespan examined. Clinical and ethical decision making will be discussed.

Prerequisite: permission of the department chairperson.

Open only to SPAA graduate students.

642 Audiology for Speech-Language Pathologists. (2) Overview of audiology oriented toward the needs of speech-language pathologists. Hearing screening and follow-up. Audiogram interpretation. Hearing aids and FM systems. Cochlear implants. Central auditory processing problems: symptoms and management.

Prerequisite: SPAA 343, 344 or permission of the department chairperson.

643 Speech-Language Pathology for Audiologists. (2) Overview of speech-language pathology oriented toward the needs of audiologists.

Prerequisite: SPAA 210, 371.

648 Hearing Anatomy, Physiology and Disorders. (4) Graduate level study of the anatomy and physiology of the hearing mechanism and of conductive, sensorineural, and central hearing disorders.

Prerequisite: SPAA 343.

649 Clinical Orientation and Practicum in Audiology. (2-10) Orientation to clinical practicum in audiology. Practicum experience in a variety of diagnostic and habilitative procedures.

Prerequisite: SPAA 343, 344 and concurrent or prior enrollment in SPAA 655; permission of the department chairperson.

A total of 10 hours of credit may be earned.

650 Pediatric Audiology. (3) Topics specific to the nature and management of auditory problems in children. Development of the auditory system. Genetics of hearing loss. Syndromes associated with hearing loss. Educational audiology.

Prerequisite: SPAA 343, 344.

651 Auditory Problems and Management in Adults. (3) Topics specific to the nature and management of auditory problems in adults. Tinnitus, cerumen management, assistive devices, adult and aural rehabilitation and hearing aid orientation, self assessment scales, consumer groups and advocacy.

Prerequisite: SPAA 343, 344.

652 Psychoacoustics, Instrumentation, and Calibration. (3) Psychoacoustics and acoustic phonetics. Calibration of audiologic equipment.

Prerequisite: SPAA 260, 659.

653 Measures of the Vestibular System. (2) Vestibular anatomy and physiology and its relation to the auditory system. Administration and interpretation of electronystagmography and other vestibular measures. Relationship of vestibular measures to auditory disorders and their diagnosis and treatment.

Prerequisite: SPAA 161, 343; permission of the department chairperson.

654 Evoked Potential Testing. (3) Nature, use, administration, and interpretation of evoked potentials. Relationship of evoked potentials to other diagnostic procedures.

Prerequisite: SPAA 161, 343, 648; permission of the department chairperson.

655 Diagnostic Audiology. (3) Standard audiological testing and interpretation. Masking. Speech audiometry. Functional disorders: symptoms and diagnostic procedures. Immittance testing and interpretation.

Prerequisite: SPAA 260, 343.

656 Speech Perception and Hearing Aids. (4) Hearing loss and speech perception as related to amplification. Overview of hearing aids.

Prerequisite: SPAA 655.

657 Advanced Diagnostic Audiology.

(3) Site-of-lesion tests other than immittance, evoked potentials, and electronystagmography. Central auditory processing disorders: nature, diagnosis, and management.

Prerequisite: SPAA 655.

658 Private Practice and Related

Professional Issues. (2) Consideration of issues related to private practice audiology. Includes information on how the history of audiology and hearing aid dispensing has affected the profession. Other professional issues, such as certification and licensing, will be discussed.

659 Industrial and Other Audiologic Settings. (1) Audiologic practice in industrial and other settings.

Prerequisite: SPAA 655.

660 Otoacoustic Emissions. (1) Nature, use, administration, and interpretation of otoacoustic emissions. Relationships of otoacoustic emissions to other diagnostic procedures.

Prerequisite: SPAA 343, 648.

661 Cochlear Implants. (2) Cochlear implants, including candidacy, devices, speech perception and production, aural rehabilitation, and educational implications. Includes brainstem implants.

Prerequisite: SPAA 343, 344, 648, 650, 654, 656, 657.

662 Pharmacology for Audiologists. (2) Pharmacology as related to the practice of audiology, including ototoxic agents and interdrug reactions.

Prerequisite: SPAA 648, 655.

663 Counseling Issues in Audiologic Practice. (1) Counseling issues related to the practice of audiology.

Prerequisite: SPAA 650, 651, 655.

664 History and Issues of the Profession of Audiology. (1) History of the profession of audiology. Past, present, and future issues facing the profession.

690 Seminar in Speech-Language Pathology. (1–6) Seminars will be offered on selected topics in speech-language pathology. Topics to be covered will be identified in advance for each seminar offered.

Prerequisite: permission of the department chairperson.

A total of 12 hours of credit may be earned, but no more than 6 in any one semester or term.

691 Seminar in Audiology. (1–4)

Offered on selected topics in audiology. Topics to be covered will be identified in advance for each offering.

Prerequisite: permission of the department chairperson.

A total of 4 hours of credit may be earned.

692 Directed Study in Speech-Language Pathology and Audiology. (1–3) Individual directed study in speech language pathology and audiology.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned, but no more than 3 in any one semester or term.

693 Internship in Speech Pathology or Audiology. (3–9) On-the-job

experience in such places as hospitals, rehabilitation centers, private practices, nursing homes, community speech and hearing centers, etc.

Prerequisite: permission of the department chairperson.

A total of 18 hours of credit may be earned, but no more than 9 in any one semester or term.

695 School Internship in Speech Language Pathology or Audiology. (3–9) On-the-job experience in a school setting.

Prerequisite: permission of the department chairperson.

A total of 18 hours of credit may be earned, but no more than 9 in any one semester or term.

749 Audiology Practicum. (1–4)

Supervised clinical practicum in audiology on and off campus. Experience in a variety of diagnostic and rehabilitative procedures.

Prerequisite or parallel: SPAA 343, 655; permission of the department chairperson.

A total of 26 hours of credit may be earned, but no more than 4 in any one semester or term.

Open only to Au.D. students.

766 Hearing Aids 2. (3) Advanced course on hearing aids, including middle ear implants.

Prerequisite: SPAA 656.

770 Clinical Rounds in Audiology. (2) In-depth review and analysis of a variety of clinical cases in audiology.

Prerequisite: permission of the department chairperson.

Parallel: SPAA 771.

Open only to third-year Au.D. students.

771 Clinical Project in Audiology. (1)
Capstone clinical project on an approved audiologic topic.

Prerequisite: permission of the department chairperson.

Parallel: SPAA 770.

Open only to third-year Au.D. students.

793 Audiology Externship. (3) Full-time, 12-month externship in an approved audiologic facility under the joint supervision of the university audiology

faculty and the externship site professional staff. Externship may be completed at one or more sites. Taken for 3 consecutive semesters. Externship replaces the clinical fellowship year requirement of the American Speech-Language-Hearing Association.

A total of 9 hours of credit may be earned, but no more than 3 in any one semester or term.

Open only to Au.D. students.