College of Sciences and Humanities

www.bsu.edu/csh

North Quadrangle Building 112, (765) 285-1042
Dean of the College: Michael A. Maggiotto
Associate Deans: Susan M. Johnson, Donald Van Meter

Interdepartmental Programs

Asian Studies

ASIAN STUDIES (ASIAN)

598 Asian Studies: Selected Readings. (3) Topics for independent study and research to be chosen and investigated in consultation with the department and instructor involved.

Prerequisite: permission of the program director.

A total of 6 hours of credit may be earned.

Science

www.bsu.edu/sciencedoc

Director of Doctoral Programs: Walter Smith

www.bsu.edu/physics

Director of Master's Programs: David Ober

MASTER OF ARTS IN GENERAL SCIENCE

Admission

The program is designed for students choosing a profession in public school teaching. While increasing their knowledge in the general sciences, students may also earn credits that can be applied to license renewal.

Applicants for all graduate programs offered by the Department of Physics and Astronomy must meet the admission requirements of the Graduate School and take the Graduate Record Exam (GRE) or an equivalent exam.

Degree Requirements

The student may write a research paper (RES 697) or a thesis (THES 698) on a research project in a specific science area or on a science education topic. The research paper earns a total of 3 hours credit and the thesis earns 6 hours credit.

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Major requirements Course work in at least three of the following: biology, chemistry, earth space science (geology and/or astronomy), and physics.			15–24
SCI	696	Cur Is Sc Ed (3–6)	
	or		
PHYCS	691	Adv Gen Sci (3)	3
THES	698	Thesis (1–6)	
	or		
RES	697	Research Ppr (1–3)	
	or		
BIOT	590	Recomb Techn (3)	
	or		
SCI	699	Res Mth Ed (3)	3–6
Minors and nondepartmental electives as approved by the department			0–6
			30 hrs

Minors are optional, but if taken must include at least 6 hours of courses approved by a designated advisor from the minor area and the department of physics and astronomy.

DOCTORAL PROGRAMS

Programs Administration

The Science and Science Education Doctoral Coordinating Committee, chaired by the director of doctoral programs, is responsible for the administration of the doctor of science and doctor of science education programs.

Admission

Applicants must meet admission requirements of the Graduate School. Applicants for the EdD in science education must hold valid teaching licenses and have had at least two years of successful public school teaching. The applicant's credentials are screened by the director of doctoral programs and an admissions committee in the applicant's major science field. Correspondence and interviews are used to evaluate potential applicants before admission to either degree program. The GRE (general test and advanced test in the proposed science major field) is required. A faculty committee reviews the applicant's credentials and rules on acceptance or denial. An interview with the applicant may be requested by the committee.

Residency Requirement

Students in the doctor of education in science and science education programs have two alternatives to fulfill residency requirement:

- completion of at least 15 semester hours in two consecutive semesters of graduate work beyond the master's.
- completion of at least 24 hours in four consecutive semesters with a minimum of 6 hours in each of these semesters.

DOCTOR OF EDUCATION IN SCIENCE

This degree prepares students to become teachers in community colleges and liberal arts colleges or universities. Candidates plan a broad-based major in a science field with supporting work in education and a second science. The dissertation is written either in the science field or in education in the student's major science field. A teaching internship, a required part of the program, allows candidates to acquire experience in the techniques of conventional as well as technology oriented systems instruction. The program requires a minimum of 90 hours of approved graduate work beyond the bachelor's degree.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Major Area of Study Courses in major field selected from one of the following or related areas: biology, chemistry, computer science, geology, mathematical sciences, natural resources and environmental management, physics/astronomy, or physiology/health sciences.			36
SCI	696	Cur Is Sc Ed (3–6)	3
	790	Intern Sc Ed (1–4)	3
ID	705	Resrch Collq (1–3)	2
Cognate 24 hours in a science field different from the major; or 15 hours in a science field or related area different from the major plus 9 hours in education not included in the education requirement.			24

Education			
A course in learning or in development			3
EDPSY	646	Tests Meas	3
EDHI	609	Prep Prof	3
	610	Isu High Ed	3
DISS	799	Drs Dissert (1–10)	10
			90 hrs

DOCTOR OF EDUCATION IN SCIENCE EDUCATION

This degree prepares students to assume positions as science education leaders in the K–12 setting or as university science educators. The major consists of approximately equal components of education and science with supporting work in additional science fields. The dissertation is concerned with science education at the elementary, middle, secondary, or college level. A teaching internship, a required part of the program, gives the candidate experience in methods classes and in lower-division science classes. The program requires a minimum of 90 hours of approved graduate work beyond the bachelor's degree.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Major Area of Study			
Courses in major field selected from one of the following or related areas: biology, chemistry, computer science, geology, mathematical sciences, natural resources and environmental management, physics/astronomy, or physiology/health sciences			25
SCI	696	Cur Is Sc Ed (3–6)	3
	790	Intern Sc Ed (1–4)	3
ID	705	Resrch Collq (1–3)	2
Cognate			
Courses in a science field different from the major or related area			15
Education			
Courses in education and science education not included in major			20
A course in learning or in development			3
EDPSY	646	Tests Meas	3
EDHI	609	Prep Prof	3
	610	Isu High Ed	3
DISS	799	Drs Dissert (1–10)	10
			90 hrs

SCIENCE (SCI)

690 Workshop in Science Education. (1–12) Practical experience with teaching science at specific level (early childhood, elementary, middle, secondary, or higher education) and/or specific topic (e.g., chemistry or geology). May be repeated for different level and/or topic.

Prerequisite: teaching experience or certification or permission of the instructor.

A total of 24 hours of credit may be earned, but no more than 12 in any one semester or term.

695 Advanced Teaching Methods in Science. (3–6) Recent developments in science teaching at specific level (early childhood, elementary, middle, secondary, or higher education) and/or specific topic (e.g., biology or physics). May be repeated for different level and/or topic.

Prerequisite: teaching experience or certification or permission of the instructor.

A total of 6 hours of credit may be earned.

696 Current Issues in Science Education. (3–6) Current research and theory of teaching science at specific level (early childhood, elementary, middle, secondary, or higher education) and/or specific science topic (e.g., chemistry or geology). May be repeated for different level and/or topic.

Prerequisite: permission of the instructor.

A total of 6 hours of credit may be earned.

699 Research Methodology in Science Education. (3) Identification of research problems in science and science education. Introduction to types of research, research design, and grant-writing. Review of literature pertinent to a special topic of student interest. Development of a research proposal.

Prerequisite: permission of the department chairperson.

790 Internship in Science Education. (1–4) Supervised experience in instruction of science or science education courses.

Prerequisite: permission of the department chairperson.

A total of 4 hours of credit may be earned.

SOCIAL STUDIES

www.bsu.edu/history
Director of Master's Program: Dean Cantu

MASTER OF ARTS IN SOCIAL SCIENCE

Admission

Applicants must meet the admission requirements of the Graduate School. To qualify for a graduate assistantship in the department, an applicant must take the general and subject (one of the social science disciplines) tests of the Graduate Record Examination (GRE) and ordinarily have an undergraduate grade point average of at least 3.0 on a scale of 4.0.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Major requirements			
Courses from anthropology, economics, geography, government, psychology, sociology, United States history, and world civilization; at least one social studies methods course.			
Three courses must be 600-level.			15
Research requirement			
SS	694	Sem Cur Inst (1–5)	
or			
RES	697	Research Ppr (1–3)	
or			
THES	698	Thesis (1–6)	3–6
Minors and electives			9–12
			30 hrs

DEPARTMENTS

ANTHROPOLOGY

www.bsu.edu/anthropology
Burkhardt Building 315, (765) 285-1575
Chairperson: Paul B. Wohlt
Graduate Committee: Gail Bader, Ronald Hicks, Don Merten
Graduate Faculty: Bader, Bowers, Boyd, Cochran, Coffin, Groover, Hicks, McCord, Merten, M. Quinlan, R. Quinlan, Waite, Wohlt

PROGRAMS

Master of arts (MA) in anthropology

Admission

Applicants must meet the admission requirements of the Graduate School, meet a cumulative undergraduate minimum grade point average of 2.75 on a 4.0 scale, and have the approval of the department graduate committee. The graduate committee bases its decisions on the applicant's

undergraduate transcripts; Graduate Record Examination (GRE) scores; written recommendations; and a 300–500 word narrative detailing relevant background, reasons for wishing to undertake graduate study in this department, and the relationship of such study to long-term goals and interests in anthropology. Applicants whose undergraduate majors are not anthropology 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. It is suggested that students wishing to specialize in archaeology participate in a summer field school or have equivalent experience before beginning studies.

MASTER OF ARTS IN ANTHROPOLOGY

Degree Requirements

The minimum requirement for the MA in anthropology is 32 hours of graduate credit. Although students are encouraged to take general courses, specializations are available in cultural and physical anthropology and archaeology. In keeping with the principle that students should have a broad knowledge of anthropology, core courses covering three of the major subdisciplines are required; this requirement can be waived only by the graduate committee. In order for students to acquire a background in anthropological thought, ANTH 600 Graduate Studies Seminar and ANTH 612 Anthropological Theory are also required. A required 6-hour thesis permits students to specialize and acquire skills in research methods and techniques. Beyond these requirements, each student's plan of study will be tailored to individual needs.

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Required Courses			
ANTH	600	Grad Sem (1–2)	2
	601	Scop Cultral	3
	603	Scop Archaeo	3
	605	Scop Physicl	3
	612	Anth Theory	3
THES	698	Thesis (1–6)	6
12 hours from ANTH or other electives approved by graduate advisor			12
			32 hrs

Graduate Minor in Anthropology

Requires a minimum of 9 hours of approved anthropology courses. Students wishing to pursue a minor should contact the department chairperson before taking any anthropology courses.

ANTHROPOLOGY (ANTH)

504 History of Archaeology. (3) Development of archaeological thought over the past two centuries focusing on major figures and their contributions.

Not open to students who have credit in ANTH 404.

505 Topics in Physical Anthropology. (3–9) Covers a variety of advanced current and special topics in physical anthropology, depending on students' interests and capacities. May be repeated for different topics.

Prerequisite: an introductory physical anthropology course; permission of the instructor.

A total of 9 hours of credit may be earned.

506 The Anthropology of Physical Growth and Development. (3) Children's physical growth and development, its regulation, variation, and assessment in different times and places.

Prerequisite: an introductory physical anthropology course.

Not open to students who have credit in ANTH 306.

507 Applied Anthropology. (3) Investigates the problems and work that engage the attention of anthropologists outside the university setting. Examination of new skills needed to supplement those traditionally taught in anthropology.

Not open to students who have credit in ANTH 307.

512 Ecological Dimensions of Culture. (3) Explores the system of relationships between any human population and its environment, focusing on cultural behavior. Uses studies from ancient to modern times and models and theories from ecology and anthropology.

Prerequisite: an introductory cultural anthropology course (waived for minors in Environmentally Sustainable Practices) or permission of the instructor.

Not open to students who have credit in ANTH 312.

515 Human Paleontology. (3) Fossil record of the evolution of humans and their primate predecessors.

Prerequisite: ANTH 206 or equivalent or permission of the instructor.

Not open to students who have credit in ANTH 315.

516 Human Osteology. (3) Laboratory and lecture dealing with the human skeleton including identification of whole and fragmentary bones and the assessment of the age, stature, sex, and other traits of a skeleton as applied to paleodemography, paleopathology, and forensic problems.

Prerequisite: ANTH 206 or equivalent or permission of the instructor.

Not open to students who have credit in ANTH 416.

521 Social Organization. (3) Systematic cross-cultural analysis of human organizations from kinship-based societies to modern bureaucracies. Using an evolutionary approach, develops both theoretical perspectives and practical understanding.

Prerequisite: ANTH 101, 111; permission of the instructor.

Not open to students who have credit in ANTH 321.

523 Rock Art of the World. (3) Survey of prehistoric rock art of the world, including European cave paintings. Markings will be interpreted and functionally examined with regard to aesthetic, ceremonial, and informational content. Methods of recording will be stressed.

Not open to students who have credit in ANTH 323.

525 Physical Diversity and Adaptation. (3) Human biological variation in the contemporary world: examination of its distribution, inheritance, development, and adaptiveness.

Prerequisite: ANTH 206 or permission of the instructor.

Not open to students who have credit in ANTH 305.

527 Culture and Medicine. (3) Focuses on conceptions of health and illness from a cross-cultural perspective.

Not open to students who have credit in ANTH 427.

529 Laboratory Methods in Material Culture. (3) Addresses artifacts as reflections of culture. Focuses on ethnoarchaeology and experimental archaeology, as well as the integration of research design, recovery, identification, and laboratory analysis of artifacts from archaeological sites.

Prerequisite: ANTH 101, 103.

Not open to students who have credit in ANTH 329.

530 Topics in Native North American Cultures. (3) Considers particular features of American Indian cultures or Indian cultures of a particular area not focused on by other courses. May be repeated for different topics.

Not open to students who have credit in an undergraduate course covering the same topic.

531 North American Indians. (3) Cultures of North American Indians emphasizing their economic, socio-political, and religious institutions.

Not open to students who have credit in ANTH 331.

532 Indians of the Great Lakes. (3) In-depth study of selected Native American cultures indigenous to the Great Lakes region from the time of European contact to the contemporary period.

Not open to students who have credit in ANTH 332.

534 Midwestern Archaeology. (3) Archaeological development of the Midwest traced through the Paleo-Indian, Archaic, Woodland, and Mississippian stages.

Prerequisite: ANTH 103 or 204.

Not open to students who have credit in ANTH 334.

537 Contemporary Problems of the American Indians. (3) Detailed study of current issues facing Native Americans. Particular issues facing tribes in specific regions and general issues of a pan-Indian nature will be covered. Taught in the field with seminars with Indian leaders.

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.

Not open to students who have credit in the corresponding undergraduate course in the same region.

540 Anthropological Field Trip. (3–6) Exposes students to lifeways of groups outside mainstream society whose lives and communities are significantly shaped by the policies of the larger society. Can be used for trips in various subfields of anthropology when appropriate.

Prerequisite: permission of the instructor.

A total of 6 hours of credit may be earned.

541 Anthropology and Women. (3) Development of the female phenotype; variation in the roles assigned in cultures of differing levels of complexity, from gatherer-hunters to industrial societies—both Western and nonWestern—and the contributions of women anthropologists to understanding this variation.

Not open to students who have credit in ANTH 341.

542 American Culture. (3) Examines how the values, beliefs, and norms of American culture are integrated into and symbolized in various media. Explores how Americans experience and resolve cultural tensions between individualism and community, equality and hierarchy, competition and cooperation.

Not open to students who have credit in ANTH 342.

543 Historical Archaeology. (3) Covers the major principles and techniques of archaeology as they are applied to historical sites.

Not open to students who have credit in ANTH 343.

545 Archaeological Field School. (3–6) Provides the practical application of archaeological methods, techniques, and strategies in a field setting. Participation in a supervised investigation of a formal archaeological problem at an actual archaeological site or at an experimental site.

Prerequisite: permission of the instructor.

A total of 6 hours of credit may be earned.

550 Ethnographic Field School. (9) An intensive immersion in the methods of field research in cultural anthropology. Emphasizes problem formulation, observation, interviewing, writing, and interpretation of field data. Field schools are intended to provide specific skills that result in an ethnographic report.

Prerequisite: ANTH 559; permission of the instructor.

551 Witchcraft, Magic, and Religion. (3) Anthropological study of humankind's age-old concern with life, death, sickness, and the unknown. Discusses human attempts to control life through supernatural beings, prayer, sacrifice, and techniques of magic and witchcraft.

Not open to students who have credit in ANTH 451.

555 Primatology. (3) Comparative survey of nonhuman primates, their biology and behavior.

Prerequisite: ANTH 206 or permission of the instructor.

Not open to students who have credit in ANTH 455.

557 Applied Archaeology. (3) Special problems of contract, conservation, and public archaeology, including laws and guidelines, relations with governmental and private agencies, research design and proposals, field and laboratory methods, and curation.

Not open to students who have credit in ANTH 457.

559 Ethnographic Methods. (3) Develops the ability to conduct and comprehend ethnographic research. Includes research design, data collection, analysis, reporting, basic statistics, and computer use. Emphasizes both quantitative and qualitative techniques for basic and applied research.

Prerequisite: 15 hours of ANTH courses or permission of the instructor.

Not open to students who have credit in ANTH 459.

560 Topics in Ethnology. (3) Considers special topics not covered by regular courses. One topic is studied in a semester. May be repeated for different topics.

Not open to students who have credit in an undergraduate course covering the same topic.

564 European Prehistory. (3) Prehistory of Europe from the Paleolithic through the Iron Age emphasizing the regions north and west of the classical world.

Not open to students who have credit in ANTH 364.

567 Culture Change. (3) Surveys the major concepts and processes of culture change, emphasizing the causes of change and their effects on individuals and groups.

Not open to students who have credit in ANTH 467.

570 Topics in Regional Ethnography. (3) Considers the culture of a selected geographic area not covered by regular courses. May be repeated for different areas.

Not open to students who have credit in an undergraduate course on the same geographic area.

571 Ethnohistory. (3) Methods and techniques of ethnohistory using information on traditional ethnographic groups, particularly in the Americas.

Not open to students who have credit in ANTH 471.

577 Topics in Museum Operations. (3) Introduces various aspects of museum operations, such as organization, financing, curation, exhibits, public interpretation, and conservation of collections. Emphasizes ethnographic and archaeological collections. May be repeated for different topics.

Not open to students who have credit in ANTH 377.

580 Topics in Archaeology. (3) Surveys archaeology of a selected region (e.g., Southwest) or focuses on a specialized area. May be repeated for different topics.

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

581 Culture, Economy, and Development. (3) Concerned with a culturally embedded view of allocation, conversion, production, distribution, and consumption of resources. Emphasizes economic development in third- and fourth-world countries.

Not open to students who have credit in ANTH 481.

582 Indians of the American Southwest. (3) Surveys prehistoric, historic, and contemporary cultures of selected Southwest Indian groups. Emphasizes culture-specific solutions to problems perceived in their relationship to their natural and social environments.

Not open to students who have credit in ANTH 482.

600 Graduate Studies Seminar. (1) Introduction to the nature, purpose, and practice of scholarly inquiry in academic and applied environments. Includes exposure to major literature and research resources in the field, familiarization with professional culture and faculty resources, individual program design, and thesis planning.

A total of 2 hours of credit may be earned, but no more than 1 in any one semester or term.

601 Scope of Cultural Anthropology. (3) Overview of theory in cultural anthropology and its application to various conditions of recent and contemporary human society and culture.

Prerequisite: undergraduate anthropology major or minor, admission to anthropology graduate program or permission of the instructor.

603 Scope of Archaeology. (3) Overview of current archaeological research foci and interpretive frameworks in their historical context. Considers the relationship of archaeology to the other subdisciplines of anthropology and broader anthropological concerns.

Prerequisite: undergraduate anthropology major or minor, admission to anthropology graduate program or permission of the instructor.

605 Scope of Physical Anthropology. (3) Survey of the basic method and theory of physical anthropology.

Prerequisite: undergraduate anthropology major or minor, admission to anthropology graduate program or permission of the instructor.

612 Anthropological Theory. (3) Focuses on conceptualization of culture and other related ideas over time. Deals with theory formulation in anthropology and other social sciences.

Prerequisite: undergraduate anthropology major or minor, admission to anthropology graduate program or permission of the instructor.

690 Independent Study in Anthropology. (1–3) Topics to be chosen and investigated in consultation with the instructor with 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.

695 Research Methods in Anthropology. (3) An opportunity to use research techniques appropriate to one or more subfields of anthropology in developing a research model, gathering and analyzing data, and organizing the material in a research paper or report.

696 Internship in Anthropology. (3–6) On-the-job experience practicing anthropology for a period of five to ten weeks with an institution or agency.

A total of 6 hours of credit may be earned.

BIOLOGY

www.bsu.edu/biology

Cooper Science Complex 121, (765) 285-8820
Chairperson: Carl E. Warnes
Director of Doctoral Programs: Walter S. Smith
Advisor of Master's Programs: Carl E. Warnes
Graduate Faculty: Badger, Bruns, Camarillo, Chatot, Clase, DeSouza, Dodson, Hammersmith, Islam, Lauer, LeBlanc, McDowell, McKillip, J. Mitchell, M. Mitchell, Morrell, Olesen, Pyron, Reilly, Ruch, Saxon, Smith, Vann, Warnes

PROGRAMS

Master of arts (MA) in biology; master of science (MS) in biology; doctor of education (EdD) in science (biology) and in science education. Graduate minors in biology are also offered at the master's level. A biotechnology certificate is also available. The science and general science program requirements may be found in the Science section, page 158.

See the Science listing under the College of Sciences and Humanities, page 159 for the doctoral programs in science and science education.

MASTER'S PROGRAMS

Admission

Applicants must meet the admission requirements of the Graduate School and submit scores from the Graduate Record Exam (GRE). Students should have good backgrounds in the life sciences, chemistry, mathematics, and physics and baccalaureate degrees with majors or minors in biology or the equivalent. Exceptions may be made by petition to the department. Students entering without adequate background are expected to make up the deficiencies during their first year.

Professionalization of a Teaching License

Any of the master's programs may be used to convert a standard-grade teaching license to a professional-grade teaching license. Teachers working toward professional certification must complete a 9-hour professional education component, which includes at least one of the following: BIO 691, 694, PHYCS 691, or SCI 696. The BIO, PHYCS, or SCI hours may count toward the major area, the other hours as minor and elective hours toward the total of 30 hours.

MASTER OF ARTS IN BIOLOGY

Designed to strengthen the student's background in biological sciences and related disciplines through course work at the graduate level; there is no research thesis requirement. Prepares students for jobs in biomedical laboratories, natural resource management agencies, scientific supply firms, environmental consulting firms, and scientific publishing firms, as well as for further education.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Approved courses from BIO, BOT, ZOOL, SCI			
THES	698	Thesis (1–6)	
	or		
RES	697	Research Ppr (1–3)	
	or		
BIOT	590	Recomb Techn (3)	
	or		
SCI	699	Res Mth Ed (3)	16–30
Minors and electives			0–14
			30 hrs

Minors are optional, but if taken must include at least 8 hours of courses

approved by a designated advisor from the minor area and the biology department.

MASTER OF SCIENCE IN BIOLOGY

Includes both graduate course work and extensive research experience culminating in a research thesis. It is designed to prepare students for further study at the doctoral level, but graduates may also find employment in research-oriented activities of government agencies or private business firms.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Major requirements			
Approved courses from BIO, BOT, ZOOL, SCI			
THES	698	Thesis (1–6)	16–30
Minors and electives			0–14
			30 hrs

Minors are optional, but if taken must include at least 8 hours of courses approved by a designated advisor from the minor area and the biology department.

GRADUATE MINOR IN BIOLOGY

Requires 8 or more hours of approved BIO, BOT, and ZOOL courses.

BIOTECHNOLOGY CERTIFICATE

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
BIO	557	Molecular	4
BIOT	590	Recomb Techn	3
	591	Th/App PCR	3
	592	Prot Iso Ana	3
	593	Prof Dev	1
	594	Cell Culture	2
	595	Seq/Bioinfo	2
	596	Res Des/Pres	2
1-6 hours from			
BIO	669	Intern Bio (1-6)	
	694	Pract Sci Ed (1–6)	
	697	Research (1–3)	
RES	697	Research Ppr (1–3)	1-6
			21–26 hrs

BIO 655 is a prerequisite for the program.

BIOLOGY (BIO)

501 Developments in Modern Biology. (3–6) Stresses recent discoveries in biology and integrates and enhances understanding of basic principles of the discipline.

A total of 6 hours of credit may be earned.

516 Population Ecology. (3) Presents fundamental principles of population growth and regulation, including both with-species and between-species interaction. Implications for over-population, endangered species, and pest and game management are discussed. Laboratory includes both experimental studies and computer simulation exercises.

Prerequisite: BIO 216.

Not open to students who have credit in BIO 416.

518 Community and Ecosystem Ecology. (3) Principles of ecological organization at the community and ecosystem levels. Emphasizes the processes that influence the structure and function of communities and ecosystems. Laboratory includes field and lab studies of plant and animal systems.

Prerequisite: BIO 216.

Not open to students who have credit in BIO 418.

520 Field Biology of Distant Areas. (3–12) The species peculiar to selected geographic areas. Ecology, flora, and fauna. Travel may be by air. Seminars may be scheduled regularly throughout the course. Registration fee may include travel charges as well as the general fee.

Prerequisite: permission of the department chairperson.

A total of 12 hours of credit may be earned.

540 Evolution. (3) Principles, evidence, and the historical context of modern evolution theory. Some attention will be given to the origin of life and the evolution of plants and animals.

Not open to students who have credit in BIO 440.

546 Applied Microbiology. (3) Study of microorganisms that effect beneficial and detrimental changes in foods (including milk and milk products) and industrial fermentations.

Prerequisite: BIO 213 or permission of the department chairperson.

Not open to students who have credit in BIO 446.

548 Biometry. (3) Principles and applications of statistics to biological problems. The use of parametric and nonparametric tests of significance in the analysis of data and the interpretation of experiments.

Prerequisite: MATHS 108 or its equivalent or permission of the department chairperson.

Not open to students who have credit in BIO 448.

552 Advanced Genetics. (3) Bacterial and eukaryotic genetics with emphasis on recent developments in molecular genetics. Topics include alternative structures of DNA, mechanisms of DNA replication, mutagenesis, DNA rearrangements, regulation of gene expression, RNA processing, and molecular and mutagenetic analysis of the cell cycle.

Prerequisite: BIO 214; CHEM 231.

Not open to students who have credit in BIO 452.

553 Human Genetics and the Problems of Humankind. (3) Current developments in human heredity. Human chromosome aberrations. DNA, the genetic code, and mutations. Consanguineous marriages and genetic defects. Mendelian principles applied to humans. Pedigrees and probability. Genetic screening and counseling. Social, ethical, and legal problems and advances in genetics.

Not open to students who have credit in BIO 453.

554 Development and Evolution of Genomes: Genomics and Proteomics. (3) Analysis of the development, expression, and evolution of genomes through the examination of genomics and proteomics. Attempts to explore the theoretical basis of developing technologies to provide models for application to current questions in biological systems from the cellular or organismal levels by treatment of the genome as a system.

Prerequisite: BIO 214, 215; or permission of the instructor.

Not open to students who have credit in BIO 454.

556 Cancer Biology. (3) Examination of the biological basis of cancer, discussion of related contemporary issues, and overview of recent advances in cancer research. Emphasis on cancer progression, tumor production, etiology/epidemiology, prevention, modern therapies, and patient management.

Prerequisite: BIO 215, its equivalent, or permission of the department chairperson.

557 Molecular Biology. (4) Structure and function of macromolecules in living things. Emphasizes three-dimensional structures; models for enzyme mechanisms, DNA replication; protein synthesis and membrane function; and applications of biotechnology.

Prerequisite: BIO 215 or the equivalent, or permission of the department chairperson.

Not open to students who have credit in BIO 457.

560 Microtechniques. (4) A lecture/lab course in the preparation of biological material for microscopic examination in teaching, research, and clinical applications. Emphasizes preparation of smears, squashes, whole mounts, paraffin, and frozen plant and animal sections, and photomicrography.

Not open to students who have credit in BIO 460.

570 Developmental Biology. (4) Recent advances and theories in early embryogenesis and developmental biology. Major emphasis on genetic and molecular mechanisms operating during developmental phenomena. Topics include fertilization, mosaic versus regulative development, regulation of gene expression, patterning, germ line and sex determination, and neoplasia. Lecture and laboratory.

Prerequisite: BIO 215 or equivalent or permission of the department chairperson.

Not open to students who have credit in BIO 470.

580 Limnology. (3) The physical, chemical, and biological characteristics of inland waters. Laboratory time and several field trips will be devoted to exploring techniques for the evaluation of representative aquatic ecosystems.

Prerequisite: BIO 216 or permission of the department chairperson.

Not open to students who have credit in BIO 480.

582 Aquatic Microbiology. (3) Microorganisms indigenous to nonpolluted and polluted aquatic ecosystems. Emphasizes nutrient cycling and the use of microorganisms as indicators of pollution. Morphology, physiology, and ecology of specific organisms. Lecture and laboratory.

Prerequisite: BIO 213.

Not open to students who have credit in BIO 482.

583 Marine Biology. (3) Introduction to marine environments. Properties of seawater, hydrodynamics. Phytoplankton and benthic plants. Primary production, nutrient cycles. Marine animals, surveys of major taxa. Adaptations for life on the bottom, open water, intertidal zones, estuaries, and abyssal regions. Problems of overexploitation and pollution.

Not open to students who have credit in BIO 483.

592 Bioethical Decision Making. (3) Development of decision-making skills through the analysis and personal resolution of bioethical problems created by the application of new biological and biomedical knowledge and technologies.

Not open to students who have credit in BIO 492.

628 Readings in Biology. (1–3) Directed readings for majors in biology. Individualized program of readings developed under the supervision of a faculty member.

Prerequisite: permission of the department chairperson.

A total of 3 hours of credit may be earned.

629 Seminar in Biology. (1) Review and discussion of the literature related to selected topics of current interest in biological research.

Prerequisite: permission of the department chairperson.

A total of 2 hours of credit may be earned, but no more than 1 in any one semester or term.

631 Virology. (4) In-depth study of viruses, particularly animal viruses. Topics will include the physical and chemical properties of viruses, virus-host interactions, pathogenesis, treatment, lab diagnosis, and prevention. Emphasizes recent developments in the primary literature.

Prerequisite: one course in microbiology and organic chemistry.

636 Immunology. (4) Study of immune responses and the immune system with particular emphasis on recent developments. Topics include cellular interactions, immunochemistry, immunogenetics, ontogeny and regulation, tolerance, and immune inflammation as well as current techniques in cellular immunology.

Prerequisite: microbiology, organic chemistry, and biochemistry or cell biology.

Not open to students who have credit in BIO 344.

641 Medical Bacteriology. (3) Study of pathogenic bacteria with emphasis on morphology and physiology. Laboratory techniques in culturing, isolating, and identifying bacteria.

Prerequisite: BIO 213; CHEM 231.

Not open to students who have credit in BIO 341.

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 elements 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, pharmacogenetics, immunogenetics, and genetic engineering.

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

655 Cell Biology. (4) Biology of the cell, including cell morphology, bioenergetics, enzyme function, cell environment, membrane structure and function, cell metabolism, and cell differentiation and growth.

Prerequisite: CHEM 360.

Not open to students who have credit in BIO 215.

669 Internship in Biology. (1–6) Paid, supervised field and laboratory experience in public or private agencies (or in the Department of Biology). Training involves application of biological principles in the work environment.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned.

691 Developments in Biology Education. (3) Origin, content, emphasis, and objectives of recent curriculum developments and philosophical approaches to teaching science in the secondary school. Student activities include presentation of current topics and creation of instructional materials that incorporate the most current techniques.

Prerequisite: an undergraduate major or minor in science.

694 Practicum in Science Education. (1–6) Science curricula and instruction in classroom situations. Needs assessment in science education from the point of view of inservice teachers and their students. Staff consultation in implementation of improved science programs.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned.

697 Research in Biology. (1–3) Independent research for biology majors at the master's level. Students' research projects must be developed in consultation with a faculty member. As much as 3 hours of credit may be applied toward a master's degree.

Prerequisite: permission of the department chairperson.

A total of 3 hours of credit may be earned.

796 Research in Biology. (1–6) Independent research for biology majors at the doctoral level. Students' proposed research projects must be developed in consultation with a faculty member.

Prerequisite: permission of the department chairperson.

A total of 8 hours of credit may be earned, but no more than 6 in any one semester or term.

BIOTECHNOLOGY (BIOT)

590 Introduction to Recombinant DNA and RNA Techniques. (3) Study of the fundamental methods and approaches used in biotechnology with experiences in recombinant DNA and RNA techniques. Emphasis on theory and practice of commonly used scientific techniques, experimental design, and reading and analysis of scientific literature.

Prerequisite: BIO 215 or 655.

Not open to students who have credit in BIOT 490.

591 Theory and Applications of the Polymerase Chain Reaction. (3) Study of the theory of the polymerase chain reaction and its standard applications in research. Emphasis on experimental design and optimization of reactions, applications in DNA and RNA analysis, differential display, site-directed mutagenesis, and subcloning of PCR products.

Prerequisite: BIO 215 or 655.

Not open to students who have credit in BIOT 491.

592 Protein Isolation and Analysis. (3) Study of the theory and application of techniques involved in protein isolation, characterization, and analysis. Emphasis on understanding principles of protein purification, laboratory experiences in protein separation, detection and analysis of structure function relationships.

Prerequisite: BIO 215 or 655.

Not open to students who have credit in BIOT 492.

593 Professional Development in Biotechnology. (1) Emphasizes curriculum vita development. Provides employment counseling, discussion of job ethics and values, information on laboratory set-up, and job interview strategies.

Not open to students who have credit in BIOT 493.

594 Cell Culture Techniques. (2) Study of the practice and theory of cell and tissue culture. Emphasis on the application of basic concepts and techniques to the in vitro culture of many different cell types.

Prerequisite: BIOT 590.

Not open to students who have credit in BIOT 494.

595 DNA Sequencing and Bioinformatics. (2) Covers the determination of DNA nucleotide sequence and Internet/software utilization of DNA and protein databases for sequence analysis.

Prerequisite: BIOT 590.

Not open to students who have credit in BIOT 495.

596 Research Design and Presentation. (2) Emphasizes improvements in oral and written communication skills, and development of an independent research proposal.

Prerequisite: BIOT 590.

Not open to students who have credit in BIOT 496.

BOTANY (BOT)

540 Taxonomy of Vascular Plants. (4) Identification, use, and care of native and ornamental trees, shrubs, vines, and herbaceous plant material. The use of botanical keys, manuals, and texts in the identification of plant taxa.

Prerequisite: BIO 112 or permission of the department chairperson.

Not open to students who have credit in BOT 440.

542 Economic Botany. (3) The cultivation, processing, environmental requirements, and use of plants and plant derivatives for food, drugs, dwellings, clothing, and power.

Not open to students who have credit in BOT 442.

544 Plant Propagation and Management. (3) Practical experience in the different methods of plant propagation, care, and cultivation for use in the home, school, garden, and greenhouse. Diseases, pathogens, and pests of the plant.

546 Medical Mycology. (3) Study of fungi with emphasis on pathogenic forms. Methods of identification of fungi will be discussed along with morphology and biochemistry of fungi.

Prerequisite: BIO 213.

Not open to students who have credit in BOT 446.

551 Plant Physiology. (4) An introductory treatment of the physiological activities of green plants with emphasis on plant growth substances, photosynthesis, and intermediate metabolism.

Prerequisite: BIO 112; CHEM 231.

Not open to students who have credit in BOT 451.

560 Plants and Their Allies. (4) Evolutionary-phylogenetic survey of plant forms. Includes bacteria, algae, fungi, bryophytes, and vascular plants. Emphasizes comparative morphology and anatomy, reproductive structures, cycles, and adaptations to varying habitats.

Prerequisite: BIO 111, 112.

570 Dendrology. (3) The identification and site characterization of woody plants with emphasis on midwestern tree species. Use of botanical features and keys in field identification. Correlation of species with site conditions, plant diseases, climatic parameters, associate species, and geographical distribution.

Prerequisite: BIO 112 or permission of the department chairperson.

Not open to students who have credit in BOT 470.

580 Plant Ecology. (3) Factors affecting the distribution and abundance of plants. Patterns, structure, and development of plants at the individual, population, and community levels. Laboratory provides experience with ecological experimentation at the physiological, population, and community levels.

Prerequisite: BIO 216 or permission of the instructor.

581 Aquatic Botany. (4) The collection and identification of nonvascular and vascular plants from fresh water ecosystems. Emphasizes morphology, physiology, and ecology of these plants to explain their distribution in nature. Class project and field trips may be used to demonstrate ecological relationships.

Prerequisite: BIO 112 or permission of the department chairperson.

Not open to students who have credit in BOT 481.

SCIENCE (SCI)

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

690 Workshop in Science Education. (1–12) Practical experience with teaching science at specific level (early childhood, elementary, middle, secondary, or higher education) and/or specific topic (e.g., chemistry or geology). May be repeated for different level and/or topic.

Prerequisite: teaching experience or certification or permission of the instructor.

A total of 24 hours of credit may be earned, but no more than 12 in any one semester or term.

695 Advanced Teaching Methods in Science. (3–6) Recent developments in science teaching at specific level (early childhood, elementary, middle, secondary, or higher education) and/or specific topic (e.g., biology or physics). May be repeated for different level and/or topic.

Prerequisite: teaching experience or certification or permission of the instructor.

A total of 6 hours of credit may be earned.

696 Current Issues in Science Education. (3–6) Current research and theory of teaching science at specific level (early childhood, elementary, middle, secondary, or higher education) and/or specific science topic (e.g., chemistry or geology). May be repeated for different level and/or topic.

Prerequisite: permission of the instructor.

A total of 6 hours of credit may be earned.

699 Research Methodology in Science Education. (3) Identification of research problems in science and science education. Introduction to types of research, research design, and grant-writing. Review of literature pertinent to a special topic of student interest. Development of a research proposal.

Prerequisite: permission of the department chairperson.

790 Internship in Science Education. (1–4) Supervised experience in instruction of science or science education courses.

Prerequisite: permission of the department chairperson.

A total of 4 hours of credit may be earned.

ZOOLOGY (ZOOL)

532 Invertebrate Zoology. (4) Comparative morphology, physiology, ecology, life histories, and phylogeny of invertebrate animal phyla.

Prerequisite: BIO 111, 112, or permission of the department chairperson.

Not open to students who have credit in ZOOL 432.

540 Ornithology. (3) The study of birds including identification, systematics, anatomy, physiology, life histories, ecological relationships, and conservation. Fieldwork in addition to regular laboratory periods may be required.

Not open to students who have credit in ZOOL 440.

541 Entomology. (3) Anatomy, physiology, taxonomy, life histories, habits, and adaptations of insects.

Prerequisite: BIO 111, 112, or permission of the department chairperson.

Not open to students who have credit in ZOOL 441.

544 Ichthyology. (3) The study of fish with emphasis on identification, classification, anatomy and physiology, and ecology. Emphasizes Indiana species but includes other important species.

Prerequisite: BIO 111, 112, or permission of the department chairperson.

Not open to students who have credit in ZOOL 444.

545 Herpetology. (3) Introduction to the biology of amphibians and reptiles, including their origin, anatomy, physiology, classification, behavior, and ecology. Through extensive field trips, the laboratory will emphasize identification and observation of amphibians and reptiles in their natural habitats.

Prerequisite: BIO 112.

Not open to students who have credit in ZOOL 445.

546 Mammalogy. (3) The evolutionary origin, characteristics, and distribution of recent mammals. The economic relationships of mammals. The collection and preservation of specimens. May require additional fieldwork.

Not open to students who have credit in ZOOL 446.

583 Wildlife Biology. (3) The identification, population dynamics, and geographic distribution of wildlife species with particular emphasis on those of the United States. The harvest and management of wildlife. May require additional fieldwork.

Prerequisite: BIO 216 or permission of the department chairperson.

Not open to students who have credit in ZOOL 483.

584 Aquatic Entomology. (3) Immature and adult stages of aquatic insects, including collecting techniques, identification, ecological requirements, morphology, and evolutionary adaptations to lentic and lotic conditions. Emphasizes aquatic insects as indicators of environmental quality and stress.

Prerequisite: ZOOL 541 or permission of the department chairperson.

Not open to students who have credit in ZOOL 484.

670 Field Zoology. (3) The field study of animals—terrestrial and aquatic, invertebrate and vertebrate, microscopic

and macroscopic—with emphasis on the collection and identification of non-insect invertebrates.

682 Animal Ecology. (3) The composition, development, dynamics, and geographic distribution of animal communities. The relationships between animals and the physical, chemical, and biotic elements of the environment. Includes physiological ecology and ethology. Field studies of animal communities.

CHEMISTRY

www.bsu.edu/chemistry

Cooper Science Complex 305, (765) 285-8060
Chairperson: Robert Morris
Graduate Advisor: Robert Morris
Graduate Faculty: Bock, Lang, Morris, Parra-Belky, Pattison, Poole, Sammelson, Sousa, Storhoff, Towns

PROGRAMS
Master of science (MS) in chemistry and master of arts (MA) in chemistry

See the Science listing under the College of Sciences and Humanities, page 158, for doctoral programs in science and science education.

Admission

Applicants must meet the admission requirements of the Graduate School and should have satisfactory Graduate Record Examination (GRE) verbal and quantitative scores.

MASTER OF ARTS IN CHEMISTRY

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Chemistry option			
CHEM	500	Chem Comunic	1
	563	Prn Biochm 1	3
	626	Adv Analytic	3
	636	Adv Org Chem	3
	646	Adv Phy Chem	3
	651	Adv Inorgan	3
	673	Seminar	1
Graduate chemistry courses approved by the graduate advisor			9
Research requirements 4 hours from			
CHEM	670	Resrch Chem (1–7)	
	696	Resrch Meth (2)	
RES	697	Research Ppr (1–3)	4
			30 hrs
Chemical Education option			
CHEM	500	Chem Comunic	1
	563	Prn Biochm 1	3
	626	Adv Analytic	3
	636	Adv Org Chem	3
	646	Adv Phy Chem	3
	651	Adv Inorgan	3
	673	Seminar	1
Graduate chemistry courses approved by the graduate advisor			9
Research requirements 4 hours from			
CHEM	671	Resrch Ch Ed (1–7)	
	696	Resrch Meth (2)	
RES	697	Research Ppr (1–3)	4
			30 hrs

MASTER OF SCIENCE IN CHEMISTRY

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Chemistry option			
CHEM	500	Chem Comunic	1
	563	Prn Biochm 1	3
	626	Adv Analytic	3
	636	Adv Org Chem	3
	646	Adv Phy Chem	3
	651	Adv Inorgan	3
	673	Seminar	1
Research requirements			
CHEM	670	Resrch Chem (1–7)	7
THES	698	Thesis (1–6)	6
			30 hrs

Chemical Education option

CHEM	500	Chem Comunic	1
	563	Prn Biochm 1	3
	626	Adv Analytic	3
	636	Adv Org Chem	3
	646	Adv Phy Chem	3
	651	Adv Inorgan	3
	673	Seminar	1

Research requirements

CHEM	671	Resrch Ch Ed (1–7)	7
THES	698	Thesis (1–6)	6

30 hrs

These programs are designed for students who hold bachelor of science or bachelor of arts degrees in chemistry, including at least one year of calculus-based physical chemistry. Students with substantial backgrounds (e.g., those who have completed at least ACS-certified bachelor's degrees or work beyond the bachelor's level) may have one or more of the core course requirements waived, but the minimum number of 30 hours required for graduation still applies. These students should discuss the possibilities with the chemistry graduate advisor.

Students with substantial chemistry backgrounds but who have undergraduate degrees in such other disciplines as biology, medical technology, premedicine, or predentistry may be admitted to the graduate program to begin some graduate course work while making up undergraduate deficiencies. However, courses taken to remove undergraduate deficiencies cannot be applied to total graduate hours. These students should discuss their situations with the chemistry graduate advisor to determine whether their backgrounds are sufficient to begin graduate work in chemistry.

CHEMISTRY (CHEM)

500 Chemical Communications. (1) Use of scientific literature, sources, and classification systems, and current and retrospective searches in the specialized branches of chemistry.

Prerequisite: 20 hours of chemistry or permission of the department chairperson.

Not open to students who have credit in CHEM 400.

520 Chemical Instrumentation 1. (3) Theoretical principles and applications of selected spectroscopic, electro chemical, and chromatographic methods, with illustrative experiments. Two hours of lecture and one three-hour laboratory period weekly.

Prerequisite: CHEM 225, 344 or 340 or permission of the department chairperson.

Not open to students who have credit in CHEM 420.

521 Chemical Instrumentation 2. (3) Advanced treatment of selected topics in spectroscopy, electrochemistry, and chromatography. Introduction to mass spectroscopy, nuclear methods, and thermal and surface analysis. Three hours of lecture weekly.

Prerequisite: CHEM 520 or permission of the department chairperson.

525 Instrumental Methods of Analysis. (3) Practical applications of modern chemical instrumentation: electrometric, chromatographic, and spectroscopic methods. For chemical/medical technologists or departmental minors. Two hours of lecture and one three-hour laboratory weekly.

Prerequisite: CHEM 225.

Not applicable to MS or MA degree programs in chemistry.

Not open to students who have credit in CHEM 325.

530 Organic Laboratory Techniques. (2) Laboratory course that includes multi-step syntheses of organic compounds, their isolation, purification, and characterization using modern spectroscopic and chromatographic techniques. Six hours of laboratory weekly.

Prerequisite: CHEM 232 or its equivalent.

Not open to students who have credit in CHEM 430.

540 Selected Principles of Physical Chemistry. (3) Introduction to the properties of solids, liquids, gases, and solutions and to the basic concepts of thermodynamics and kinetics. Especially for premedical, biology, and general science majors, chemistry teaching majors, and chemistry minors. Two hours of lecture and one three-hour recitation/laboratory period weekly.

Prerequisite: CHEM 225; MATHS 161.

Not open to students who have credit in CHEM 340, 344, or 544.

544 Physical Chemistry. (4) Thermodynamic and structural description of chemical processes and

properties of solids, liquids, gases, and solutions. Three hours of lecture and one three-hour laboratory period weekly.

Prerequisite: CHEM 235 or 232; MATHS 166; one year of college physics.

Not open to students who have credit in CHEM 344.

Cannot be used for credit by a candidate for the master of science degree with chemistry as a major.

545 Physical Chemistry. (4) Continuation and extension of CHEM 544. Topics include reaction kinetics, theoretical facets of quantum mechanics, and spectroscopy. Three hours of lecture and one three-hour laboratory period weekly.

Prerequisite: CHEM 344 or 544.

Not open to students who have credit in CHEM 345.

Cannot be used for credit by a candidate for the master of science degree with chemistry as a major.

550 Inorganic Chemistry. (4) Chemistry of the elements, including the relationships of chemical properties and atomic and molecular structure, chemical bonding, acid-base theories, chemical periodicity, and modern theories of coordination compounds. Four hours of lecture weekly.

Prerequisite: CHEM 232 or 235 or 360; MATHS 161 or 165.

Not open to students who have credit in CHEM 450.

560 Essentials of Biochemistry. (4) Organic chemistry of carboxylic acids, amines, and their derivatives; biochemistry of proteins, carbohydrates, lipids, and nucleic acids; metabolism and the regulation of metabolic processes. For students in life sciences, dietetics, and medical technology. Three hours of lecture and one three-hour laboratory session weekly.

Prerequisite: CHEM 231 or the equivalent.

Not applicable to MS or MA degree programs in chemistry.

Not open to students who have credit in CHEM 360 or 463 or 563.

563 Principles of Biochemistry 1. (3) Chemistry of proteins, enzymes, nucleic acids, carbohydrates, and lipids. For chemistry, life sciences, and premedicine majors. Three hours of lecture weekly.

Prerequisite: CHEM 232 or 235.

Not open to students who have credit in CHEM 463.

564 Principles of Biochemistry 2. (3) Continuation and extension of CHEM 563 including biological oxidations and energy transfers; metabolism of carbohydrates, lipids, proteins, and nucleic acids; and regulation of metabolic processes. Three hours of lecture weekly.

Prerequisite: CHEM 463 or 563.

Not open to students who have credit in CHEM 464.

575 Exploration of Selected Topics in Chemistry. (1–3) Discussion or written reports or both in advanced special topics in or related to chemistry. Examples are topics in neurochemistry, physical organic, chemical synthesis, kinetics, spectroscopy, etc.

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.

626 Advanced Analytical Chemistry. (3) Survey of modern analytical chemistry. Topics include sampling, wet chemical techniques, nonaqueous systems, and contemporary research and applications in chromatography, spectroscopy, and electrochemistry. Three hours of lecture weekly.

Prerequisite: CHEM 225 or the equivalent.

636 Advanced Organic Chemistry. (3) Topics include nomenclature, bonding, acids and bases, sterochemistry, structure-reactivity relationships, and mechanisms of important reactions. Introduction to synthesis, the disconnect approach, synthons, protecting groups, and functional group interconversions.

Prerequisite: CHEM 235 or 232 or the equivalent.

646 Advanced Physical Chemistry. (3) Survey of physical chemical principles with emphasis on practical applications. Topics include thermodynamics, reaction kinetics, and selected quantum chemical applications.

Prerequisite: CHEM 345 or its equivalent.

651 Advanced Inorganic Chemistry. (3) Continuation of CHEM 550. Current theories of bonding in coordination chemistry. Descriptive and theoretical treatments of the chemistry and structure of transition metal complexes,

organometallic compounds, fluxional molecules, and metal clusters; the importance of metals in biological systems. Three hours of lecture weekly.

Prerequisite: CHEM 450, 340 or 344.

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 the medical education program.

670 Research in Chemistry. (1–7) Original work at the molecular level on projects based in the current scientific literature. The projects will be directed by graduate faculty and will typically involve aspects of ongoing research.

Prerequisite: permission of the department chairperson.

A total of 7 hours of credit may be earned.

671 Research in Chemical Education. (1–7) Original work based on the current science education literature. Projects will be directed by graduate faculty and may involve conducting surveys, developing new instructional materials or methods, or evaluating the effectiveness of technology-based teaching.

Prerequisite: permission of the department chairperson.

A total of 7 hours of credit may be earned.

673 Seminar in Chemistry. (1) Critical examination and discussion of recent experimental and theoretical developments in chemistry.

Prerequisite: CHEM 400 or 500; permission of the department chairperson.

675 Advanced Topics in Chemistry. (1–3) Discussion, experimentation, or both in specialized topics for the qualified advanced student. Information concerning specific topics offered during a given semester may be obtained from the departmental office. Lecture and laboratory schedules appropriate to the topics offered.

Prerequisite: permission of the department chairperson.

A total of 3 hours of credit may be earned.

690 Contemporary Instruction and Curricula in Chemistry. (2–4) Designed to make the inservice chemistry teacher familiar with management of large-group instruction, development and implementation of multimedia materials in instructional schemes, use of videotape in the laboratory, and facility design for modular and other systems. Field trips to nearby schools to study facility design may be included. Two hours of lecture weekly.

Prerequisite: permission of the department chairperson.

A total of 4 hours of credit may be earned.

696 Chemistry Research Methods. (2) Introduction to use of scientific literature, design of research experiments, specialized techniques, and writing skills endemic to the specialized fields of chemistry. Class and laboratory experience appropriate to students' specializations.

Prerequisite: CHEM 400 or 500; permission of the department chairperson.

770 Research in Chemistry. (1–12) In-depth original work at the molecular level on projects based in the current scientific literature. The projects will be directed by graduate faculty and will typically involve aspects of ongoing research.

Prerequisite: permission of the department chairperson.

A total of 12 hours of credit may be earned.

771 Research in Chemical Education. (1–12) In-depth original work based on the current science education literature. Projects will be directed by graduate faculty and may involve conducting surveys, developing new instructional materials or methods, or evaluating the effectiveness of technology-based teaching.

Prerequisite: permission of the department chairperson.

A total of 12 hours of credit may be earned.

773 Chemistry and Chemical Education Seminar. (1–3) In-depth analyses of recent trends and developments in chemistry or chemical education.

Seminar participants report on assigned topics to departmental groups.

Prerequisite: permission of the department chairperson.

A total of 3 hours of credit may be earned.

COMPUTER SCIENCE

www.cs.bsu.edu

Robert P. Bell Building 455, (765) 285-8641
Chairperson: Kunwarjay Bagga
Graduate Program Advisor: Sam Hsieh
Graduate Faculty: Bagga, Buis, Green, Hsieh, Luer, McGrew, Nelson, Owens, Sun, Tanksale, Tzeng, D. Zage, W. Zage, Zhang

PROGRAMS

The master of science (MS) degree is primarily for students with undergraduate degrees in computer science who plan to undertake further graduate study or apply computer science in a variety of fields. A minor in computer science is also offered.

See the Science listing under the College of Sciences and Humanities, page 157, for the doctoral programs in science and science education.

Admission

In addition to meeting the admission requirements of the Graduate School, applicants must have departmental approval for admission. Applicants must submit three letters of recommendation, a one-page statement of educational goals, and scores from the Graduate Record Examination (GRE). Students without an adequate computer science background will be required to take directed courses in which they earn an average grade of at least *B*. No credit toward a degree will be granted for these courses.

MASTER OF SCIENCE IN COMPUTER SCIENCE

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*

Required mathematics background courses (unless the student has credit in equivalent courses). No graduate credit given, but a grade point average of at least 3.0 is to be maintained.

MATHS	161	Appl Calc 1 (3)	
	162	Appl Calc 2 (3)	
	217	Lin Algebra (4)	
	221	Pbty Stats (3)	

Required computer science background courses (unless the student has credit in equivalent courses). No credit given toward the degree, but a grade of at least a *B* is to be earned in each course.

CS	120	Comp Sci 1	3
	121	Comp Sci 2	3
	124	Discr Struct	3
	230	Assembler	3
	232	Data Struct	3
	324	Dsg Ana Algo	3
	333	Sys Arch Org	3
	335	Prog Lang	3

Thesis option
Required courses

CS	570	Thy Cmptn 1	3
	670	Thy Cmptn 2	3
	689	Res Methods	3
	693	Resrch Collq	1
	697	Software Eng	3
THES	698	Thesis (1–6)	6

15 hours of electives (including at least one 600-level course, other than CS 699)

CS	527	Networks (3)
	530	System Prog (3)
	536	Database Dsg (3)
	537	Net Prog (3)
	538	Graphics (3)
	539	Curr Tpcs CS (3–6)
	542	Simulations (3)
	545	G U I (3)
	555	Artfl Intl 1 (3)

	556	Comp Vision (3)	
	557	Appl Cryptog (3)	
	576	Op Systems (3)	
	578	Compil Const (3)	
	638	Topics Graph (3)	
	639	Seminar (3)	
	668	Graph Algo (3)	
	699	Read Honor (3)	
MATHS	562	Numer Anls 1 (3)	
	563	Numer Anls 2 (3)	15
			34 hrs

Non-thesis option

Required courses

CS	570	Thy Cmptn 1	3
	670	Thy Cmptn 2	3
	689	Res Methods	3
	693	Resrch Collq	1
	697	Software Eng	3

21 hours of electives (including at least two 600-level courses, other than CS 699)

CS	527	Networks (3)	
	530	System Prog (3)	
	536	Database Dsg (3)	
	537	Net Prog (3)	
	538	Graphics (3)	
	539	Curr Tpcs CS (3–6)	
	542	Simulations (3)	
	545	G U I (3)	
	555	Artfl Intl 1 (3)	
	556	Comp Vision (3)	
	557	Appl Cryptog (3)	
	576	Op Systems (3)	
	578	Compil Const (3)	
	638	Topics Graph (3)	
	639	Seminar (3)	
	668	Graph Algo (3)	
	699	Read Honor (3)	
MATHS	562	Numer Anls 1 (3)	
	563	Numer Anls 2 (3)	21
			34 hrs

MINOR IN COMPUTER SCIENCE

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
12 hours from			
CS	527	Networks (3)	
	530	System Prog (3)	
	536	Database Dsg (3)	
	537	Net Prog (3)	
	538	Graphics (3)	
	540	Data Pro Tec (3)	
	542	Simulations (3)	
	545	G U I (3)	
	555	Artfl Intl 1 (3)	
	556	Comp Vision (3)	
	557	Appl Cryptog (3)	
	570	Thy Cmptn 1 (3)	
	576	Op Systems (3)	
	578	Compil Const (3)	
	638	Topics Graph (3)	
	639	Seminar (3)	
	668	Graph Algo (3)	
	670	Thy Cmptn 2 (3)	
	689	Res Methods (3)	
	697	Software Eng (3)	
	699	Read Honor (3)	
MATHS	562	Numer Anls 1 (3)	
	563	Numer Anls 2 (3)	12
			12 hrs

DOCTOR OF EDUCATION WITH MAJOR IN COMPUTER SCIENCE

EdD programs in science or science education with computer science as the major area are available. See the Science listing on page 157 under the College of Sciences and Humanities for details.

COGNATE IN THEORY OF COMPUTING

This cognate is aimed at the EdD in science candidate who already has the background coursework in computer science that is required of all candidates entering the master of science degree program in computer science, as well as the relevant mathematical background prerequisites to the program.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
CS	570	Thy Cmptn 1	3
	668	Graph Algo	3
	670	Thy Cmptn 2	3
			9 hrs

Electives (choose two courses for the 15 credit hour cognate, or five courses for the 24-hour cognate.)

CS	538	Graphics	3
	555	Artfl Intl 1	3
	557	Appl Cryptog	3
	638	Topics Graph	3
	639	Seminar	3
	699	Read Honor	3
MATHS	562	Numer Anls 1	3
	563	Numer Anls 2	3
			6 or 15 hrs

Up to 9 hours of 500-level courses permitted on the 15-hour cognate; up to 12 hours of 500-level courses permitted on the 24-hour cognate.

COMPUTER SCIENCE (CS)

500 Fundamentals of Computing. (3) Develop programming skills in a structured language with emphasis on top-down design and modular structure. Experience with various commercial software packages.

Not open to computer science majors.

514 Introduction to Programming 1. (3) Problems of programming in a structured language emphasizing top-down design and modular structure. Designed primarily for experienced classroom teachers in public schools.

Not open to students who have credit in CS 110, 120, or the equivalent or to computer science majors.

516 Introduction to Programming 2. (3) An introduction to files and their applications. An introduction to a LOGO environment.

Prerequisite: CS 514 or permission of the department chairperson.

Not open to students who have credit in CS 112 or to computer science majors.

517 Introduction to Programming. (3) Software development using a high-level programming language (such as C++ or Java) for a wide range of information system applications. Structured programming, data types, functions, arrays, pointers, and recursion. Applications from areas of interest.

Not open to graduate majors in computer science.

527 Distributed Processing and Networks. (3) The hardware and software of computer networks and distributed processing. Develops the important design parameters and a general design methodology.

Prerequisite: CS 333.

530 System Programming. (3) Considers the computer system from the points of view of its architecture, operating system, and applications. Topics include processor organization, peripheral devices, I/O programming, system programs, monitor services, file organization, and real-time applications.

Prerequisite: CS 333.

Not open to students who have credit in CS 430.

534 Networked Databases. (3) Principles, methodologies, techniques, languages, and tools for database-driven Web application development. Topics include database concepts, server-side programming, client-side programming, and dynamic Web application design. Programming projects reinforcing concepts are required.

Prerequisite: CS 232.

Not open to students who have credit in CS 336.

536 Database Design. (3) An introduction to database design including physical representation, modeling, database systems, and implementation.

Prerequisite: CS 232.

Not open to students who have credit in CS 436.

537 Network Programming. (3) Client server model and software design, program interface to protocols, algorithms and issues in client and server software design. Remote procedure call concepts, distributed program generation.

Prerequisite: CS 530 or the equivalent.

538 Graphics. (3) Methods of developing, modifying, and rendering graphics displays. Emphasizes the design and writing of graphics software for both two- and three-dimensional displays. Knowledge of a structured high-level language is required.

Prerequisite: CS 232; MATHS 217.

Not open to students who have credit in CS 438.

539 Current Topics in Computer Science. (3–6) In-depth study of a topic taught in a seminar format. Topics will be posted in the department before registration.

Prerequisite: CS 324, 333, 335 or permission of the instructor.

A total of 9 hours of credit may be earned, but no more than 6 in any one semester or term.

A total of 9 hours of combined credit may be earned in CS 539, 639.

540 Data Processing Techniques. (3) Commercial data-processing techniques. Use of COBOL to solve problems in file maintenance, report writing, and sorting. Emphasizes direct-access processing techniques, including development of interactive screens.

Prerequisite: CS 230, 232.

Not open to students who have credit in CS 340.

542 Simulation Techniques. (3) An introduction to the principles and applications of simulation. Use of

higher level languages and simulation languages as applied to system studies. Use of examples from different subjects to carry out simulation.

Prerequisite: CS 232; MATHS 221.

Not open to students who have credit in CS 342.

545 Graphical User Interfaces. (3) Introduction to the principles of the design and implementation of user interfaces with emphasis on graphical user interfaces. Topics include design goals, user interface standards, event-driven programming, application of object-oriented design and programming to GUIs, menus, and dialog boxes.

Prerequisite: CS 335 or permission of the instructor.

Not open to students who have credit in CS 345.

547 Computer, Information, and Network Security. (3) Topics include encryption, decryption, protocols, viruses, network security, authentication, legal and ethical issues, and security in operating systems, databases, e-commerce, Internet, wireless. Algorithms, protocols, applications such as RSA, DES, SSL, Firewalls, Digital Signatures, and VPNs, and emerging topics will be explored.

Prerequisite: CS 232.

555 Introduction to Artificial Intelligence. (3) Introduction to basic programming techniques of artificial intelligence (AI). Symbol manipulation and AI problem-solving techniques. Topics include LISP primitives, LISP objects, evaluation, recursion, iteration, data abstraction, macros, object-centered programming, symbolic pattern matching, and basic problem-solving methods.

Prerequisite: CS 324, 335.

556 Computer Vision and Machine Intelligence. (3) Project based, dealing with basic principles of digital image processing and computer vision. Topics such as digital image formats, geometric operations on digital images, filtering, histogramming, binarization of grayscale images, labeling binary images, perimeter and area determination, thinning operations, object recognition using global features, edge detection processes.

Prerequisite: CS 333 or permission of the instructor.

Not open to students who have credit in CS 456.

557 Applied Cryptography. (3) Introduction of basic principles and application of cryptography. Topics include encryption, decryption, private and public key systems, and their mathematical foundation: divisibility and Euclidean algorithms, arithmetic of congruences, and large prime numbers. Projects are implementations of related algorithms. LISP and JAVA are recommended languages.

Prerequisite: CS 232.

Not open to students who have credit in CS 457.

570 Theory of Computation 1. (3) Mathematical logic; alphabets and languages; finite automata, regular and nonregular languages, and Kleene's theorem; regular grammars; pushdown automata and context-free grammars; Turing and Post machines; recursive and recursively enumerable languages; the Chomsky Hierarchy.

Prerequisite: CS 324, 333, 335.

Not open to students who have credit in CS 470.

576 Operating Systems. (3) The functions and structure of computer operating systems. Processor, memory, and device management. Concurrency and process synchronization. Input/output handling, device drivers, and disk scheduling. File systems. Operating system design philosophy.

Prerequisite: CS 333.

Not open to students who have credit in CS 476.

578 Compiler Construction. (3) Review of context-free grammars and basic parsing concept, compiler organization, and construction of components for a compiler.

Prerequisite or parallel: CS 570.

Not open to students who have credit in CS 478.

636 Advanced Database Systems. (3) Topics include knowledge representation and ontology concepts, object database concepts, database security and authorization, distributed databases, client-server architectures, Internet databases, and emerging database technologies and applications. Programming of both database techniques and application servers is based on current technologies such as ORACLE.

Prerequisite: CS 336 or 534 or 436 or 536 or permission of the instructor.

638 Advanced Topics in Computer Graphics. (3) Topics will be chosen from current research areas in computer graphics and from advanced topics in classical computer graphics. Possible topics include fractals, ray tracing, animation techniques, and geometric modeling.

Prerequisite: CS 438 or 538.

639 Seminar in Computer Science. (3) Readings and conferences assigned in some particular problem or group of problems in computer science.

Prerequisite: CS 324, 333, 335.

A total of 9 hours of combined credit may be earned in CS 539, 639.

665 Applied Computational Geometry. (3) Topics such as algorithms for polygon triangulation, polygon partitioning and their applications, convex hulls in two and three dimensions and their applications, Voronoi diagrams and their applications, search and intersection algorithms, robot motion planning, and implementation of algorithms.

Prerequisite: CS 324 or permission of the instructor.

668 Graphs, Algorithms, and Applications. (3) Concepts of graph theory. Algorithms for graph traversal, shortest paths, connectivity, spanning trees, and matchings. Applications of graphs to computer programming, software engineering, VLSI design, networks and flows, and parallel programming.

Prerequisite: CS 324 or permission of the instructor.

670 Theory of Computation 2. (3) Computability and decidability; introduction to the theory of computational complexity; the classes sP and NP; NP-completeness; examples of some NP-complete problems; nondeterminism and parallel computation; proving the correctness of programs.

Prerequisite: CS 570.

689 Research Methods in Computer Science. (3) Discussions on research areas in computer science, scientific methods of research, and dissemination of research. Requirements include presentations and written reports that demonstrate proficiency in presentation tools and techniques, statistical and experimental design techniques, and library and literature searches.

Prerequisite: CS 570.

693 Research Colloquium. (1) Invited presentations on topics of current interest in computer science. Students must attend a minimum of 75 percent of the presentations in each of two semesters in order to earn credit.

697 Software Engineering. (3) Software engineering principles and concepts. The software life cycle, structured specifications, design tools and techniques, software reliability, and verifying program correctness.

Prerequisite or parallel: CS 689.

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

699 Reading and Honors. (3) Special advanced work not offered in other courses. Requirements include a final written report and a presentation in the departmental colloquium series.

Prerequisite: CS 324, 333, 335; 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.

A total of 12 hours of combined CS 539, 639, and 699 credit may be earned.

Criminal Justice and Criminology

www.bsu.edu/cjc
North Quadrangle 248, (765) 285-5979
Chairperson: James E. Hendricks
Graduate Faculty: Brown, Byers, Hendricks, Ho, McKean, Nickoli

CRIMINAL JUSTICE AND CRIMINOLOGY (CJC)

650 Criminal Justice Administration. (3) An examination of the study of the principles of administration of criminal justice agencies and the development of present and future criminal justice leaders.

651 Interpersonal Relations in Criminal Justice. (3) Exploration of interpersonal relationships in an agency context. Examines issues peculiar to criminal justice agencies, including cynicism, trauma, burnout, everyday stressors, authoritarian management structures and leadership styles, peer loyalty versus organizational loyalty versus public duty, and public relations.

652 Philosophical Aspects of Criminal Justice Practice. (3) Provides philosophical and moral bases for the establishment and operation of justice system agencies charged with enforcement of criminal codes and preservation of social order, including an overview of fundamental philosophical issues of justice system practices.

690 Independent Study in Criminal Justice. (1–3) An opportunity to study specific topics related to the criminal justice system.

Prerequisite: permission of the instructor.

A total of 3 hours of credit may be earned.

English

www.bsu.edu/english
Robert P. Bell Building 297, (765) 285-8580
Chairperson: Bruce Hozeski
Director of Graduate Studies: Herbert Stahlke
Graduate Faculty: Beach, Bogue, Bove, Carlacio, Christman, Collier, Dimoplon, Ely, Felsentein, Fisher, Fleckenstein, Habich, Hanson, Hartman, Hozeski, Huff, Liston, Lybeck, MacKay, McBride, McKinney, Mix, Mulder, Neely, Newbold, Nowatzki, Onkey, Papper, Peterson, Priebe, Ranieri, Rice, Riddle, Seig, Stahlke, Stedman, G. Strecker, W. Strecker, Trechsel, Trimmer, Van Camp, Yanos

PROGRAMS

Master of arts (MA) in English (general, composition, creative writing, and literature), in linguistics, and in teaching English to speakers of other languages (TESOL); doctor of philosophy (PhD) in English (with concentration areas in literature, in composition, and in applied linguistics).

Cognates are available in composition, literary theory, literature, linguistics, TESOL, and English language arts.

MASTER OF ARTS IN ENGLISH (GENERAL)

Admission

Applicants must meet the admission requirements of the Graduate School, have undergraduate grade point averages of at least 3.0, and submit Graduate Record Examination (GRE) or Test of English as a Foreign Language (TOEFL) scores, brief autobiographies, examples of their scholarly or critical writing, and three letters of recommendation.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Core requirements			
Approved courses in English			15–29
Research requirement			
ENG	601	Res Eng Stu (3)	
	or		
RES	697	Research Ppr (1–3)	
	or		
THES	698	Thesis (1–6)	3–6
Minors and electives			0–14
			32 hrs

MASTER OF ARTS IN ENGLISH (COMPOSITION)

Admission

Applicants must meet the admission requirements of the Graduate School, have undergraduate grade point averages of at least 3.0, submit GRE scores (required for native speakers of English) or TOEFL scores (required for nonnative speakers of English), brief autobiographies and examples of their scholarly writing, and three letters of recommendation.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Core requirements			
ENG	604	Tech Eng St	3
	620	Ling St Eng	3
	690	Seminar Composit	3
	691	Adv Composit (3)	
	or		
	693	Writ in Prof (3)	3
	694	Cls Rhetoric	3
	699	Contemp Comp	3
RES	697	Research Ppr (3)	
	or		
THES	698	Thesis (6)	3–6
Electives			8–11
			32 hrs

MASTER OF ARTS IN ENGLISH (CREATIVE WRITING)

Admission

Applicants must meet the admission requirements of the Graduate School, have undergraduate grade point averages of at least 3.0, and submit GRE or TOEFL scores, official transcripts from all colleges attended, brief (300-word) autobiographies, portfolios of 20 pages of creative writing, and three letters of recommendation.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Core requirements			
ENG	610	Th Crea Wrtg	3
	614	Pr Lit Edit (3)	
	or		
	605	Tch Eng Stu (3)	3
Complete 3–9 hours from			
ENG	611	Wkp Cr Nonfi (3–9)	
	and/or		
	612	Fict Wtg Wkp (3–9)	
	and/or		
	613	Poetry Wr Wk (3–9)	3–9
Courses in literature			6
THES	698	Thesis (1–6)	6
Electives			6
			33 hrs

MASTER OF ARTS IN ENGLISH (LITERATURE)

Admission

Applicants must meet the admission requirements of the Graduate School, have undergraduate grade point averages of at least 3.0, and submit GRE or TOEFL scores, scores on the GRE specialized test "Literature in English," brief autobiographies, examples of their scholarly or critical writing, and three letters of recommendation.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Core requirements			
ENG	601	Res Eng Stu	3
	606	Lit Theory 1 (3)	
	or		
	607	Lit Theor 2 (3)	3
17–20 hours of approved graduate courses in literature including			
American literature			6
British and World literature			
Before 1660			3
After 1660			3
Approved literature electives			5–8
Research requirement			
RES	697	Research Ppr (1–3)	
	or		
THES	698	Thesis (1–6)	3–6
Electives			0–3
			32 hrs

MASTER OF ARTS IN LINGUISTICS

Admission

Applicants must meet the admission requirements of the Graduate School, have undergraduate grade point averages of at least 3.0, have the equivalent of at least two years of college-level study of a foreign language (requirement can be met during MA in teaching English to speakers of other languages (TESOL) program), and submit two-page autobiographies including a statement of academic purpose, Graduate Record Examination (GRE) scores (required for native speakers of English) or Test of English as a Foreign Language (TOEFL) scores (required for nonnative speakers of English), examples of their scholarly writing, and three letters of recommendation.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
ENG 520 or the equivalent will be required but will not count towards required hours in the degree.			
Major requirements			
ENG	601	Res Eng Stu	3
	621	Mod Eng Gram	3
	622	His Eng Lang (3)	
	or		
	631	Hist Linguis (3)	3
	623	Ling Phonets	3
	625	Phonology	3
	626	Syntax	3
	627	Socioling	3
	628	Lang Culture	3
	632	Discrs Anls	3
Electives			6
Research requirement			
RES	697	Research Ppr (1–3)	3
			36 hrs

MASTER OF ARTS IN TEACHING ENGLISH TO SPEAKERS OF OTHER LANGUAGES (TESOL)

Admission

Applicants must meet the admission requirements of the Graduate School, have undergraduate grade point averages of at least 3.0, have the equivalent of at least two years of college-level study of a foreign language (requirement can be met during MA in TESOL program), and submit two-page autobiographies including a statement of academic purpose, (GRE) scores (required for native speakers of English) or Test of English as a Foreign Language (TOEFL) scores (required for nonnative speakers of English), examples of their scholarly writing, and three letters of recommendation.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
ENG 520 or the equivalent will be required but will not count towards required hours in the degree.			
Major requirements			
ENG	536	Th Res TESOL	3
	537	Methods ESOL (3–12)	6
	624	Issues S L A	3
6 hours from			
ENG	627	Socioling (3)	
	or		
	628	Lang Culture (3)	
	or		
	632	Discrs Anls (3)	6
6 hours from			
ENG	621	Mod Eng Gram (3)	
	or		
	623	Ling Phonets (3)	
	or		
	630	Contras Anls (3)	6
Electives			9
Research Requirement			
RES	697	Research Ppr (1–3)	3
			36 hrs

MASTER OF ARTS IN TEACHING ENGLISH TO SPEAKERS OF OTHER LANGUAGES (TESOL) AND LINGUISTICS

Admission

Applicants must meet the admission requirements of the Graduate School, have undergraduate grade point averages (GPA) of at least 3.0, have the equivalent of at least two years of college-level study of a foreign language (requirement can be met during MA in TESOL program), and submit two- page autobiographies including a statement of academic purpose, Graduate Record Examination (GRE) scores (required for native speakers of English) or Test of English as a Foreign Language (TOEFL) scores (required for nonnative speakers of English), examples of their scholarly writing, and three letters of recommendation.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
ENG 520 or the equivalent will be required but will not count towards required hours in the degree.			
Major requirements			
ENG	536	Th Res TESOL	3
	537	Methods ESOL (3–12)	6
	601	Res Eng Stu	3
	621	Mod Eng Gram	3
	622	His Eng Lang (3)	
	or		
	631	Hist Linguis (3)	3
	623	Ling Phonets	3
	624	Issues S L A	3
	625	Phonology	3
	626	Syntax	3
	627	Socioling	3
	628	Lang Culture	3
	630	Contras Anls	3
	632	Discrs Anls	3
Research requirement			
RES	697	Research Ppr (1–3)	3
			45 hrs

DOCTOR OF PHILOSOPHY IN ENGLISH

Concentration in Applied Linguistics

Admission

Applicants to the PhD in English with a concentration in applied linguistics must meet the admission requirements of the Graduate School, submit two-page autobiographies, statements of academic purpose, graduate grade point averages (GPA) of at least 3.3 (preferably 3.5), cumulative GRE general scores of at least 1500 (required for native speakers of English) or (for nonnative speakers of English) cumulative TOEFL scores of at least 575, examples of their scholarly or critical writing, and three letters of recommendation. Before writing their comprehensive examinations candidates must demonstrate competence in two foreign languages, other than English, relevant to their research.

Degree Requirements

The PhD in English with a concentration in applied linguistics requires a total of 48 graduate hours in that area and a dissertation (with 10 associated hours). Up to 32 hours from the MA degree may be applied to the total hours for the doctoral degree. Students must take a minimum of 48 hours of coursework at Ball State exclusive of dissertation hours. Students may elect to take one or more doctoral cognates in an appropriate department or university area.

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
ENG	601	Res Eng Stu	3
	621	Mod Eng Gram	3
	622	His Eng Lang (3)	
	or		
	631	Hist Linguis (3)	3
	623	Ling Phonets	3
	625	Phonology	3
	626	Syntax	3
	627	Socioling	3
	628	Lang Culture	3
	629	Sem Ap Ling (3–9)	3
	632	Discrs Anls	3
	691	Adv Composit (3)	
	or		
	693	Writ in Prof (3)	3
	721	Topics Gramm	3
	725	Topics Phono	3
	726	Gramm Theory	3
Directed electives			6
Electives			32
DISS	799	Drs Dissert (1–10)	10
			90 hrs

Concentration in Composition

Admission

Applicants for the PhD in English with a concentration in composition must meet the admission requirements of the Graduate School, submit two-page autobiographies, one-page philosophies

of education, GRE scores of at least 550 (preferred) on verbal aptitude, graduate grade point averages of at least 3.3 (preferably 3.5), examples of their scholarly or critical writing, and three letters of recommendation. Nonnative speakers of English may substitute TOEFL scores for GRE scores.

Degree Requirements

The PhD in English with a concentration in composition requires 42 hours in that area, 12 hours in literature, and a dissertation (with 10 associated hours). Up to 32 hours from the MA degree may be applied to the total hours for the doctoral degree. Students must take a minimum of 48 hours of coursework at Ball State exclusive of dissertation hours. Students may elect to take one or more doctoral cognates in an appropriate department or university area. Before writing their comprehensive examinations, candidates must demonstrate competence in one language other than English relevant to their research.

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
ENG	601	Res Eng Stu	3
	604	Tech Eng St	3
	605	Tch Eng Stu	3
	606	Lit Theory 1	3
	620	Ling St Eng	3
	690	Seminar Comp	3
	691	Adv Composit	3
	692	Writ Tech	3
	694	Cls Rhetoric	3
	695	M & E Mod Rh	3
	696	19th C Rhet	3
	697	Contemp Rhet	3
	699	Contemp Comp	3
EDPSY	641	Statist Meth	3
DISS	799	Drs Dissert (1–10)	10
Literature courses (excluding ENG 601, 605, 606 and 607)			12
Electives			26
			90 hrs

Concentration in Literature

Admission

Applicants for the PhD in English with a concentration in literature must meet the admission requirements of the Graduate School, submit two-page autobiographics, one-page philosophies of education, Graduate Record Examination (GRE) scores of at least 550 on verbal aptitude (preferred), graduate grade point averages of at least 3.3 (preferably 3.5), examples of their scholarly or critical writing, and three letters of recommendation. Nonnative speakers of English may substitute TOEFL scores for the GRE aptitude test. In addition, all applicants for the concentration in literature must submit scores for the GRE subject test in literature of at least 550 (preferred).

Degree Requirements

The PhD in English with a concentration in literature requires 48 hours and a dissertation (with 10 associated hours). Up to 32 hours from the MA degree may be applied to the total hours for the doctoral degree. Students must take a minimum of 48 hours of coursework at Ball State exclusive of dissertation hours. Students may elect to take one or more doctoral cognates in an appropriate department or university area. Before writing their comprehensive examinations, candidates must establish competence in one language other than English relevant to their research.

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
ENG	601	Res Eng Stu	3
	605	Tch Eng Stu	3
	605	Tch Eng Stu	3
	693	Writ in Prof	3
	606	Lit Theory 1 (3)	
	or		
	607	Lit Theor 2 (3)	3
3 hours in each of the following areas: (must include at least 3 hours of American Literature) British Literature to 1500; British/American literature 1500–1700; British/American literature 1700–1800; British/American literature 1800–1900; Literature 1900–present.			15
One course in one of the following areas: American ethnic studies Gender studies International studies			3
Directed electives At least 15 hours of electives in courses chosen in consultation with advisor.			15
Electives			32
DISS	799	Drs Dissert (1–10)	10
			90 hrs

ENG 605 is to be taken once as "Composition" and a second time as "Literature."

DOCTORAL COGNATE IN LITERARY THEORY

See the department for information regarding course selection.

For purposes of advising, enrollment in all graduate courses in the Department of English requires permission of the department.

ENGLISH (ENG)

520 Introduction to Linguistics. (3) Basic concepts, scope, and methodology of the science of language.

Prerequisite: permission of the department chairperson.

Not open to students who have credit in ENG 320.

536 Theory and Research in Teaching English to Speakers of Other Languages. (3) Psychological, sociocultural, and linguistic bases of language learning; research and theoretical perspectives related to second language teaching.

Prerequisite: knowledge of a foreign language, permission of the department chairperson.

Parallel: ENG 520.

Not open to students who have credit in ENG 436.

537 Methods and Materials in Teaching English to Speakers of Other Languages. (3) Study and practice of a variety of methods and materials in teaching English as a second or foreign language. Discussion of pedagogical issues in language teaching. Topics vary each semester; consult the department for a schedule of offerings. Lecture and lab.

Prerequisite: permission of the department chairperson.

Parallel: ENG 520.

A total of 12 hours of credit may be earned, but no more than 3 in any one semester or term.

Not open to students who have credit in ENG 437.

588 English Studies Abroad. (3–6) English studies at approved study abroad sites. Credit applied to department requirements as approved by the department chairperson.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned.

601 Research in English Studies. (3) Research methods in composition, English education, language and linguistics, and/or literature.

Prerequisite: permission of the department chairperson.

602 English Internship. (1–6) Supervised on-the-job training and work experience in which English majors and minors apply what they have learned. Involves assigned duties in an organization, agency, corporation, bank, or professional office, with appropriate monetary compensation for services rendered.

Prerequisite: undergraduate English major or minor; permission of the internship program director.

A total of 6 hours of credit may be earned. A maximum of 3 hours may apply as elective credit toward the MA or PhD in English.

603 Independent Study. (1–2) Independent study and research in composition, creative writing, English education, language and linguistics, or literature.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned, but no more than 2 in any one semester or term.

604 Technology in English Studies. (3) Theory and practice of using major technologies in the teaching of English; primary emphasis on postsecondary level. Focuses on practical activities related to planning and carrying out text-intensive teaching with technology. No prior computer experience is necessary.

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.

605 Teaching in English Studies. (3) Instruction and, where appropriate, close supervision in pedagogical theory and practice and other proficiencies and skills required for success in university teaching.

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.

606 Literary Theory 1. (3) Critical theory through New Criticism and its application to selections from the various forms of literature.

Prerequisite: permission of the department chairperson.

607 Literary Theory 2. (3) Contemporary critical theory and its application to selections from the various forms of literature.

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.

608 Seminar in Theory. (3) Topics in theory. Advanced study of the work of specified theorists or in specified theoretical paradigms.

Prerequisite: permission of the department chairperson.

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

609 Indiana Writing Project. (1–6) Training in writing, research, and teaching according to the National Writing Project model. Taught by the IWP director or codirector assisted by teacher consultants. Applies to a degree only with the department chairperson's permission. The course is not intended to substitute for certification or degree requirements.

Prerequisite: permission after application to the Indiana Writing Project director.

A total of 9 hours of credit may be earned, but no more than 6 in any one semester or term.

610 Theory of Creative Writing. (3) Theories of the arts of poetry, fiction, and creative nonfiction propounded and exhibited in works by writers, with emphasis on the contemporary.

Prerequisite: permission of the department chairperson.

611 Workshop in Creative Non-Fiction. (3) Instruction, practice, and criticism in a workshop format.

Prerequisite: permission of the department chairperson.

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

612 Workshop in Fiction Writing. (3) Instruction, practice, and criticism in a workshop format.

Prerequisite: permission of the department chairperson.

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

613 Workshop in Poetry Writing. (3) Instruction, practice, and criticism in a workshop format.

Prerequisite: permission of the department chairperson.

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

614 Practicum in Literary Editing. (3) History and philosophy of literary publishing, with practical experience in editorial work and production in print and electronic formats.

Prerequisite: permission of the department chairperson.

620 Linguistics and the Study of English. (3) An introduction for non-specialists to areas of linguistics pertinent to the study and teaching of English literature and composition.

Prerequisite: permission of the department chairperson.

621 Approaches to Modern English Grammar. (3) An intensive study of the structure of modern English.

Prerequisite: ENG 520; permission of the department chairperson.

622 History of the English Language. (3) History of the development of the phonological, morphological, lexical, and syntactical systems of the English language from its beginnings to the present day.

Prerequisite: permission of the department chairperson.

623 Linguistic Phonetics. (3) Speech sounds and the linguistic methods employed in their description, classification, and analysis as elements in language systems.

Prerequisite: permission of the department chairperson.

624 Issues in Second Language Acquisition. (3) Issues, models, and methods in second language acquisition research.

Prerequisite: ENG 536, 537; permission of the department chairperson.

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

625 Phonology. (3) General characteristics of speech sounds and of the systematic relationships they exhibit in natural languages. Emphasizes current research in generative phonology.

Prerequisite: ENG 623; permission of the department chairperson.

626 Syntax. (3) The theory of syntax and its application to the analysis of natural language. Emphasizes current formal and functional approaches.

Prerequisite: ENG 520; permission of the department chairperson.

627 Sociolinguistics. (3) Examines the correlation of linguistic variation with geographic areas and social variables such as sex, age, socioeconomic status, and ethnicity.

Prerequisite: ENG 320 or 520; permission of the department chairperson.

628 Language and Culture. (3) Examines the ways members of different cultures organize and exploit their linguistic resources. Topics include registers and forms of address, verbal art, conversational strategies, code-switching, language maintenance and death, and cross-cultural miscommunication.

Prerequisite: permission of the department chairperson.

629 Proseminar in Applied Linguistics. (3–9) Intensive study of a selected topic or closely related set of topics relevant to applied linguistics. May be repeated if the topic changes.

Prerequisite: ENG 520; 9 additional hours in applied linguistics or permission of the department chairperson.

A total of 9 hours of credit may be earned.

630 Contrastive Analysis. (3) Study of language universals and comparison of the structural systems of natural languages.

Prerequisite: ENG 520, 621; knowledge of a foreign language; permission of the department chairperson.

631 Historical Linguistics. (3) Scientific study of the process of linguistic change. A survey of the methods and principles used in historical and comparative linguistic analysis.

Prerequisite: ENG 623, 625; permission of the department chairperson.

632 Discourse Analysis. (3) A detailed examination of the principal methods of analyzing oral and written discourse.

Prerequisite: ENG 520 or 621; permission of the department chairperson.

633 Practicum in Teaching English to Speakers of Other Languages. (1–6) Practical experience related to the teaching of English as a second or foreign language.

Prerequisite: permission of the department chairperson.

Parallel: ENG 536 or 537.

A total of 6 hours of credit may be earned.

637 Issues in Teaching English to Speakers of Other Languages. (3) Advanced topics on theory, research, and practice in teaching English to speakers of other languages.

Prerequisite: ENG 537; permission of the department chairperson.

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

Open only to graduate students.

640 Studies in American Authors. (3) Focused study of the works and lives of selected American authors.

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.

641 Early American Literature. (3) Examination of selected literary works written through 1830. Attention will also be given to cultural, political, and intellectual contexts and to current scholarship on the period.

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.

642 Literature of the American Renaissance. (3) Examination of literary works written from 1830 to 1865. Attention will also be given to cultural, political, and intellectual contexts, and to current scholarship on the period.

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.

643 The Age of American Realism. (3) Examination of selected literary works from the middle of the nineteenth century into the earliest part of the twentieth century. Considers authors, their work, their philosophies of art, and current scholarship on the period.

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.

644 Early Twentieth-Century American Literature. (3) Examination of literary works and intellectual and aesthetic movements during the first half of the twentieth century. Attention will be given to cultural, political, and intellectual contexts and to current scholarship on the period.

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.

645 Contemporary American Literature. (3) Examination of literary works from 1945 to the present.

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.

646 Studies in American Ethnic Literature. (3) Study of literary works that express the experiences and cultures of American population groups whose voices have not been adequately represented in the literary and social mainstream.

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.

647 African American Literature. (3) Examines African American literature focusing on the role of vernacular speech and music; the social status of African Americans and their relations with other racial groups; the connections between race, class, gender, and sexuality; and relevant literary criticism and theory.

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.

650 Seminar in Literature. (3) Special topics in literature. Advanced study of a time period, form, nation, and/or specific issue or problem in literary studies.

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.

651 Studies in the Novel. (3) Special topics in the novel. Advanced study of a time period, form, nation and/or specific issue or problem.

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.

652 Studies in Poetry. (3) Special topics in poetry. Advanced study of a time period, form, nation and/or specific issue or problem.

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.

653 Studies in Drama. (3) Special topics in drama. Advanced study of a time period, form, nation and/or specific issue or problem.

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.

654 Film Studies. (3) Investigation of theoretical and critical approaches to the cinematic text, which may include studies of language, form, history, reception, narrative, culture, ideological formation, technological innovation, and representation.

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.

655 Gender Studies. (3) Exploration of issues in gender theory, which may include studies of power, language, literature, culture, identity, sexuality, representation, and pedagogy, as well as interdisciplinary connections to other political and philosophical theories of race, class, gender, ethnicity, and nationality.

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.

656 Cultural Studies. (3) Investigation of cultural studies as it relates to specific texts, social themes, and issues.

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.

657 Post-Colonial Studies. (3) Focused study of post-colonial literature and literary theory.

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.

659 Workshop in Literature. (3–9) Specific themes or specific units of American, British, or world literature. Stresses both the cooperative efforts of participants and faculty and the critical approaches to literature that are most useful in reading and teaching the literature.

Prerequisite: permission of the department chairperson.

A total of 9 hours of credit may be earned.

660 Studies in British Authors. (3) Focused study of the works and lives of selected British authors.

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.

661 Early British Studies. (3) Intensive study of early British literature emphasizing language, sources, structure, and significance of the works. Aspects of early culture pertinent to the works will be considered.

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.

662 Renaissance and Seventeenth-Century Studies. (3) Study of selected works of nondramatic English literature of the Tudor, Stuart, and Puritan periods (1485–1660), exclusive of Shakespeare.

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.

663 Studies in Shakespeare. (3) Study of major Shakespearean dramas and major Shakespearean criticism. Some attention given to the sonnets.

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.

664 Studies in English Literature of the Restoration and Eighteenth Century. (3) An extensive study of the nondramatic works of Dryden, Swift, Pope, and Johnson, with possible supplementary readings from other British authors of the period 1660–1800.

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.

665 Romantic Studies. (3) Examination of literary works from the Romantic period. Attention given to the cultural and intellectual contexts of the period as well as current scholarship relevant to the period.

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.

667 Victorian Studies. (3) Examination of literature of the Victorian period. Attention given to cultural and intellectual contexts and to the current scholarship relevant to the period.

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.

668 Early Twentieth-Century British Literature. (3) Focused study of selected works in early-twentieth-century British literature and culture.

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.

669 Contemporary British Literature. (3) Focused study of selected works in contemporary British literature and culture.

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.

670 Seminar in English Education. (3–9) Investigations of special topics related to the teaching of English.

Prerequisite: permission of the department chairperson.

A total of 9 hours of credit may be earned.

671 Reading Literature in the English Classroom. (3) The process of reading literature. Emphasizes current theoretical and research bases for effective reading of literature in the English classroom.

Prerequisite: permission of the department chairperson.

672 Workshop in English Language Arts. (3–9) A study of the objectives, materials, and teaching techniques employed at the various levels of English language arts instruction with emphasis on application to specific classroom situations. Course content and requirements designed to meet individual needs and interest.

Prerequisite: permission of the department chairperson.

A total of 9 hours of credit may be earned.

673 English Language and Grammar in the Schools. (3) An introduction to the scientific study of the English language. The relation of contemporary language description and research to the teaching of English skills in the schools.

Prerequisite: permission of the department chairperson.

674 Teaching English Language Arts in the Elementary Grades. (3) A critical review of trends and issues and their implications for the teacher in the elementary grades.

Prerequisite: permission of the department chairperson.

675 Teaching English Language Arts in the Junior High/Middle School. (3) Recent issues, research, and teaching of English language arts in the junior high/middle school.

Prerequisite: permission of the department chairperson.

676 Teaching English Language Arts in the Secondary Schools. (3) Survey of theories, objectives, and methods related to teaching English language arts.

Prerequisite: permission of the department chairperson.

677 Literature for Young Children. (2) Appraisal of literature for young children. Of special interest to students of early-childhood education.

Prerequisite: permission of the department chairperson.

678 Children's Literature. (3) Overview of the field of children's literature and intensive study of the various genres. Includes study of theoretical issues, research, and recommended practice in teaching children's literature along with the study of a sampling of recently published children's books.

Prerequisite: permission of the department chairperson.

679 Young Adult Literature. (3) Recent literature suitable for students of varying abilities in junior high/middle and secondary schools. Emphasizes the actual reading of selections with some attention given to methodology.

Prerequisite: permission of the department chairperson.

Not open to students who have credit in ENG 414.

680 History of English Education. (3) A comprehensive review of the history of English education and the development of English as a school subject in the core curriculum.

Prerequisite: permission of the department chairperson.

681 Research in English Language Arts Education. (3) A critical review of the significant historical, recent, and current research in English education and its implications for teaching English language arts in elementary, middle, and secondary schools.

Prerequisite: permission of the department chairperson.

690 Seminar in Composition. (3) Special research problems in English composition using recognized techniques of research, extensive readings in selected texts, group discussions, and conferences.

Prerequisite: permission of the department chairperson.

A total of 9 hours of credit may be earned.

691 Advanced Composition. (3) Principles of and practice in the writing and evaluation of expository prose. Intended for teachers of English at the elementary, secondary, and college levels.

Prerequisite: permission of the department chairperson.

692 Writing Technologies. (3) Examination of relationships among literacy, technology, and English studies. Includes an historical approach to literacy, with major attention to how past and present technologies of literacy affect culture and education. Will explore issues and practices in laboratory sessions.

Prerequisite: permission of the department chairperson.

693 Writing in the Profession. (3) Directed writing in some of the modes required in the academic profession of English studies, with a view toward producing effective, publishable prose.
Prerequisite: permission of the department chairperson.

694 Classical Rhetoric. (3) A survey of the history and development of classical rhetoric in English composition. Special research problems in the explication of standard literary texts from a classical rhetorical perspective. Extensive readings in selected texts, some in translations from Latin and Greek.
Prerequisite: permission of the department chairperson.

695 Medieval and Early Modern Rhetoric. (3) A survey of Western rhetorical theory and practice from the fifth into the seventeenth century. Offers insight into the vocation and impact of rhetoric in the medieval and early modern period, with emphasis on implications for literacy and education.
Prerequisite: permission of the department chairperson.

696 Nineteenth-Century Rhetoric. (3) Survey of the nineteenth-century theories of composition that established the roots of contemporary teaching practices. Special research problems from a nineteenth-century rhetorical perspective using recognized techniques of research, extensive readings in selected texts, group discussions, and conferences.
Prerequisite: permission of the department chairperson.

697 Contemporary Rhetoric. (3) Overview of major contemporary rhetorical theories and practice, focusing on several major rhetoricians and recent developments in the field. Special research problems using recognized techniques of research, extensive reading in selected texts, group discussions, and conferences.
Prerequisite: permission of the department chairperson.

698 Rhetoric and Poetics. (3) Covers identification and theories of poetics in all genres. Includes classical schemes and tropes and contemporary theories about epistemology and figures of speech. Surveys Aristotle's poetics through contemporary criticism.
Prerequisite: permission of the department chairperson.

699 Contemporary Theories of Composition. (3) Focuses on theories of writing prominent during the past hundred years, contextualizing those theories in terms of history, political movements, theoretical milieux, and educational changes. Connections made to similar shifts in perspective across the academic landscape.
Prerequisite: permission of the department chairperson.

701 Directed Readings and Research. (1–3) Intensive study of a topic in literature, composition, or linguistics not ordinarily addressed in a regularly scheduled course. Intended to prepare doctoral students on a tutorial basis to research and develop an original dissertation topic.
Prerequisite: advanced graduate status in the PhD program in English; permission of the department chairperson.
A total of 3 hours of credit may be earned.

721 Topics in English Grammar. (3) Advanced topics in English grammar.
Prerequisite: ENG 520, 621, 626; permission of the department chairperson.

725 Topics in Phonological Theory. (3) Advanced topics in phonological theory. Considers data from English and other languages.
Prerequisite: ENG 520, 623, 625; permission of the department chairperson.

726 Topics in Grammatical Theory. (3) Advanced topics in grammatical theory. Considers data from English and other languages.
Prerequisite: ENG 520, 621, 626; permission of the department chairperson.

GEOGRAPHY

www.bsu.edu/geog

Cooper Science Complex 425, (765) 285-1776
Chairperson: Gopalan Venugopal
Graduate Advisor: Robert Schwartz
Graduate Faculty: Airriess, Arnold, Hawkins, Rahman, Schwartz, Turcotte, Venugopal, Zimmerman

MASTER OF SCIENCE (MS) IN GEOGRAPHY

This program is designed to provide a solid background in skills such as remote sensing, GIS, and advanced cartography to be applied to various sub-disciplines of geography and allied fields. The demands for skilled work force in these fields continues to expand in industries, business, and government, both locally and nationally. The Internet has paved the way for different types of archived and present data to be available to the public and government in a timely manner. With globalization, employers are looking for people who are skilled in the above fields. An intricate combination of several factors such as growing and changing world economy, changing environment, mobility of multinational corporations, and data availability through various sources have created a major demand for remote sensing and GIS techniques. The specialized courses in remote sensing, GIS, and advanced cartography are designed for students who are interested in handling various types of spatial data.

The Department of Geography is equipped with leading software in remote sensing, GIS, and cartography. The department's experienced faculty members can accommodate the needs of students with varied interests.

Admission

Applicants must meet the admission requirements of the Graduate School.

Degree Requirements

Requires 30 hours including the research requirement. Undergraduate deficiencies must be fulfilled as needed.

Specialized programs apply state-of-the-art technologies such as remote sensing, geographic information systems, and advanced cartography in various subdisciplines of geography, atmospheric science, and allied sciences. The requirements are flexible and allow students to arrange programs of study that will serve as a basis for further graduate study; as preparation for positions in industry, business, and government; or as a way to meet the immediate and changing needs of teachers and educators.

Course requirements

All students must complete 9 semester hours of core courses, 15 semester hours of directed electives, and 6 semester hours of Thesis (THES 698).

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Core requirement			
GEOG	601	Colloquium (1)	3
	610	Geog Thought	3
	615	Res Methods	3
	618	Quant Geog	3
Directed electives, 15 hours			
GEOG	525	Phys Meteor (3)	
	530	Wea Analysis (3)	
	531	Glob Climate (3)	
	535	Satrad Meteo (3)	
	540	Cart Graph 1 (3)	
	542	Remot Sens 1 (3)	
	543	Remot Sens 2 (3)	
	544	Adv GIS Anly (3)	
	545	GIS App Desg (3)	
	546	Sem Rem Sen (3)	
	547	Thermo Meteo (3)	
	548	GIS Sys Desg (3)	
	549	Synop Meteor (3)	
	550	Sev Loc Stor (3)	
	551	Dynamic Mete (3)	
	570	World Pol Ge (3)	

	590	F Obs Sev LS (6)	
	614	Prob Tch Es (3–6)	
	620	Seminar Geog (3)	
	625	Spl Tps GIS (3–6)	
	630	Spl Tps Cart (3–6)	
	635	Spl Tps RS (3–6)	
	640	Spl Tps Atmo (3)	
	680	D A Field St (1–6)	
	690	Prof Intern (1–3)	
	695	Rdgs Sp Stud (1–6)	15
Thesis requirement			
THES	698	Thesis (1–6)	6
			33 hrs

MINOR IN GEOGRAPHIC INFORMATION PROCESSING AND MAPPING

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Core requirement, 6 hours			
GEOG	542	Remot Sens 1	3
	544	Adv GIS Anly	3
9 hours from			
GEOG	543	Remot Sens 2 (3)	
	545	GIS App Desg (3)	
	546	Sem Rem Sen (3)	
	548	GIS Sys Desg (3)	
	625	Spl Tps GIS (3-6)	
	635	Spl Tps R S (3-6)	9
			15 hrs

GEOGRAPHY (GEOG)

525 Physical Meteorology. (3) Study of the physical processes of the atmosphere with a focus on solar and terrestrial radiation, clouds, and precipitation.

Prerequisite: GEOG 330 or 530; PHYCS 110, 120 or 140; PHYCS 112, 122 or 142.

530 Weather Analysis. (3) Presentation and practice of synoptic- and meso-scale diagnostic analysis techniques, including a review of satellite and radar remote sensing systems and image interpretation. Introduction to numerical weather prediction.

Prerequisite: GEOG 230 or equivalent.

531 Global Climate. (3) Introduction to the dynamics of the global climate system. Emphasizes the physical processes that force spatial variability in climate, and the feedback mechanisms associated with global teleconnections and climate change.

Prerequisite: GEOG 330 or 530.

535 Satellite and Radar Meteorology. (3) Study of the platforms and sensors of satellite and radar remote sensing systems used in meteorology and climatology. Emphasizes satellite and radar products and their interpretation.

Prerequisite: GEOG 330; PHYCS 110 or 120, 112 or 122 or equivalent, or permission of the instructor.

540 Cartography and Graphics 1. (3) The construction and design of maps and graphs. Basic drafting techniques and methods of cartographic presentation. Emphasizes graphic presentation of spatially disposed quantitative and qualitative data, but the techniques and methods are applicable to a wide range of subjects. Special assigned projects.

Not open to students who have credit in GEOG 340.

542 Remote Sensing and Aerial Photo Interpretation 1. (3) Principles of photo interpretation, satellite scanners, and radar. Characteristic features of remotely sensed data, classification processes, and algorithms.

Not open to students who have credit in GEOG 342.

543 Remote Sensing and Aerial Photo Interpretation 2. (3) Additional instruction and practice in remote sensing, including digital data analysis, image enhancement techniques as applied to natural resources, urban analysis, soil studies, geology, and other applied branches.

Prerequisite: GEOG 542.

Not open to students who have credit in GEOG 343.

544 Advanced Geographic Information Systems Analysis. (3) Examination and use of analysis techniques in geographic information systems (GIS). Introduction to basic GIS programming. Diagramming GIS logic and processing flows. Exposure to widely used GIS data models.

Prerequisite: GEOG 240, 265; or permission of the instructor.

Not open to students who have credit in GEOG 344.

545 Geographic Information Systems Applications Design and Development. (3) Fundamentals of geographic information system (GIS) programming. Develop and implement customized GIS applications. Exposure to widely used GIS software programming environments.

Prerequisite: GEOG 265, 544; or permission of the instructor.

Not open to students who have credit in GEOG 445.

546 Seminar in Advanced Techniques in Remote Sensing. (3) Advanced techniques applied to remotely sensed data using state-of-the-art software. Review of current methods of computer and manual interpretation techniques. Includes active participation in classroom presentations.

Prerequisite: GEOG 542, 543; or permission of the instructor.

Not open to students who have credit in GEOG 443.

547 Thermodynamic Meteorology. (3) Application of physical gas laws such as the equation of state and hydrostatic equation to investigate adiabatic processes and parcel theory as they relate to atmospheric instability and connective development.

Prerequisite: GEOG 330 or 530; PHYCS 110, 120, or 140; PHYCS 112, 122, or 142.

548 Geographic Information System Design. (3) Principles of geographic information system (GIS) design. Implementation of GIS technology. Database and user-interface design. Practical experience applying advanced GIS tools to analyze spatial data. Workshop format requires student-motivated projects.

Prerequisite: GEOG 545.

Not open to students who have credit in GEOG 448.

549 Synoptic Meteorology. (3) Investigation of synoptic- and mesobeta-scale atmospheric systems, with a focus on analysis and forecasting through the use of satellite, radar, and numerical weather predication technology.

Prerequisite: GEOG 330 or 530; GEOG 435 or 535; GEOG 451 or 551; GEOG 447 or 547.

550 Severe Local Storms. (3) Survey of severe thunderstorms and tornadoes. Focuses on storm processes and the forecasting of severe local storm events.

Prerequisite: GEOG 330 or 530.

551 Dynamic Meteorology. (3) Study of the variables that explain four dimensional atmospheric behavior with primary focus on synoptic-scale processes. Special attention is given to the governing equations and associated approximation and assumption relevant to numerical weather prediction.

Prerequisite: GEOG 330 or 530; PHYCS 110, 120, or 140; PHYCS 112, 122, or 142.

570 World Political Geography. (3) Analysis of the contribution of physical and cultural characteristics of the nations of the world to foreign relations problems.

Not open to students who have credit in GEOG 470.

590 Field Observation of Severe Local Storms. (6) Field trip to the Great Plains region to observe severe local storms. Begins with two three-hour, on-campus lecture periods, followed by a four-week period of field observation, then concludes with three two-hour, on-campus trip review lectures.

Prerequisite: permission of the instructor.

601 Departmental Colloquium and Professionalism. (1) Presentations that discuss trends, methods, and research on different insights of geography and related topics.

Prerequisite: permission of the instructor.

A total of 3 hours of credit may be earned, but no more than 1 in any one semester or term.

610 History of Geographic Thought. (3) Focuses on the role of geography in the evolution of the physical and social sciences. Traces paradigms from the premodern period of geography through its emergence as an academic discipline to its present-day applications and theory.

614 Problems in the Teaching of Earth Science. (3–6) Primarily for experienced teachers: discussion and solution of problems teachers have had in teaching the concepts of earth science, physical geography, and geology.

A total of 6 hours of credit may be earned.

615 Research Methods in Geography. (3) Examination of research-related topics relevant to first-year graduate study in geography. Focuses on use of the scientific method in solving geographic problems, although topics such as ethics, integrity, professionalism, philosophy, research project designs, and professional presentations are covered.

618 Quantitative Methods in Geography. (3) A study of quantitative techniques used in geographic research that focus on the solution of spatial problems. Emphasizes geographic and spatial data, geographic research inferences, point pattern analysis, areal association, and factor analysis in geography.

Prerequisite: MATHS 221 or equivalent.

620 Seminar in Geography. (3) Small group discussion of geographic problems selected by instructional staff and depending on students' interest.

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

Open only to majors in geography and related fields.

625 Special Topics in GIS. (3) Topics chosen from current research areas in applied GIS and from advanced topics in GIS data representation. Possible topics include advanced spatial models and object modeling with geodatabases.

Prerequisite: GEOG 544, 545; or permission of the instructor.

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

630 Special Topics in Advanced Cartography. (3) Advanced study exploring contemporary research in cartographic techniques and production. Topics include trends in cartographic research, academic and commercial sources of cartographic information, and the impact of information technology. Topics vary depending on the needs of the students.

Prerequisite: GEOG 340 or 540 or equivalent.

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

Open only to geography majors.

635 Special Topics in Remote Sensing. (3) Research in remote sensing using advanced techniques applied to a field of study such as land use, vegetation, climatology, agriculture, or environmental problems. Research activities are accompanied by presentations on advanced remote sensing topics.

Prerequisite: GEOG 542, 543.

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

640 Special Topics in Atmospheric Science. (3) The study of a topic in atmospheric science within the expertise of the instructor. Examples include such areas as land-surface-atmosphere interactions, meso-scale meteorology, hydroclimatology, climate change, and tropical weather and climate.

Prerequisite: GEOG 530.

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

Open only to majors in geography and related fields.

653 Geography of Indiana. (3) A geographic examination of the physical, cultural, and economic diversity of the state. Field experience with assigned projects supplements classroom activities.

680 Distant Areas Field Studies. (1–6) Physical, economic, and cultural geography in areas distant from the campus. Includes seminars arranged during travel.

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.

Open only to students in geography, earth science, and allied subjects.

690 Professional Internship. (1–3) Paid or unpaid supervised field and laboratory experience in public or private agents.

A total of 3 hours of credit may be earned.

695 Readings and Special Studies in Geography. (1–3) Special assigned studies in various sub-fields of geography including readings and research projects.

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

GEOLOGY

www.bsu.edu/geology
Fine Arts Building 117, (765) 285-8270
Chairperson: Alan C. Samuelson
Graduate Advisor: Richard Fluegeman
Graduate Faculty: Fluegeman, Grigsby, Neumann, Nicholson, Rice-Snow, Samuelson

PROGRAMS

Master of arts (MA) and master of science (MS) in geology and master of arts (MA) in earth science; the latter is cooperative with the Department of Geography.

See the Science listing under the College of Sciences and Humanities, page 157, for the doctoral programs in science and science education.

Admission

Applicants must meet the admission requirements of the Graduate School and have cumulative undergraduate grade point averages (GPA) of at least 2.75 overall or 3.0 for their junior and senior years and Graduate Record Examination (GRE) scores of at least 470 verbal, 530 quantitative, and 520 analytical (or an acceptable combination of GPA and GRE scores). Candidates must have completed acceptable geology field courses as undergraduates or must complete a Ball State field course as part of the master's requirements.

MASTER OF ARTS IN GEOLOGY

Degree Requirements

Requires 30 hours of graduate courses, and passing the following National Association of State Boards of Geology (ASBOG) tests: the Fundamentals of Geology Examination and the Practice of Geology Examination.

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Geology seminar requirement, 9 hours from			
GEOL	605	Sem Strat (3)	
	610	Sem Sediment (3)	
	626	Sem Tectonic (3)	
	660	Sem Hydrogeo (3)	
	670	Sem Geochem (3)	
	671	Sem Geomorph (3)	9
	685	Geo Res Meth	3
9 hours from approved graduate electives in geology			9
An approved major or minor in a second discipline or GEOL and/or other electives approved by the geology graduate advisor			9
			30 hrs

MASTER OF SCIENCE IN GEOLOGY

Degree Requirements

Requires 30 hours of graduate courses. Each student is required to write a thesis, which fulfills 6 hours of the 30-hour requirement. In a normal course of study, students are required to determine the thesis topic and committee by the end of the second semester. The completed thesis document is subject to approval by the committee following a public oral defense.

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Geology seminar requirement, 9 hours from			
GEOL	605	Sem Strat (3)	
	610	Sem Sediment (3)	
	626	Sem Tectonic (3)	
	660	Sem Hydrogeo (3)	
	670	Sem Geochem (3)	
	671	Sem Geomorph (3)	9
Thesis requirement			
THES	698	Thesis (1–6)	6
6 hours from approved graduate electives in geology			6
An approved major or minor in a second discipline or GEOL and/or			

other electives approved by the geology graduate advisor	9
	30 hrs

GEOLOGY (GEOL)

502 Global Positioning System Techniques. (1) Global Positioning System (GPS) surveying and mapping techniques. Overview of satellite and system technology, examination of various GPS units available for applications, techniques using units individually or in combination for mapping and navigation, differential GPS methods, use in computer-generated maps.

Prerequisite: permission of the department chairperson.

A total of 3 hours of credit may be earned, but no more than 1 in any one semester or term.

508 Advanced Invertebrate Paleontology. (3) Advanced study of the important fossil invertebrate phyla (Coelenterata Bryozoa, Brachiopoda, Mollusca, Arthropoda, and Echinodermata). Emphasizes individual study of selected fossil groups. Local field trip. Regularly scheduled laboratory.

Not open to students who have credit in GEOL 308.

509 Micropaleontology. (3) Morphology, classification, preparation techniques, and evolution of paleontologically significant microfossil groups and their biostratigraphic and paleoecologic significance. Emphasizes individual study of foraminifera, conodonts, and ostracodes. Regularly scheduled laboratory.

Not open to students who have credit in GEOL 409.

510 Igneous and Metamorphic Petrology. (3) Igneous and metamorphic petrology is an introduction to the processes responsible for, and the rocks and minerals associated with, the formation of both igneous and metamorphic rocks. Looks at the microscopic to macroscopic features associated with these processes. Laboratory section required.

Prerequisite: GEOL 220, 310, or permission of the department chairperson.

Not open to students who have credit in GEOL 410.

512 Sedimentary Petrology. (3) A petrographic approach to the classification and genetic interpretation of sedimentary rocks. Terrigenous sandstones and carbonate rocks will be emphasized with lesser stress on mud rocks and non-carbonate chemical rocks.

Prerequisite: GEOL 102, 220, 310, or permission of the department chairperson.

Not open to students who have credit in GEOL 412.

516 Engineering Geology. (3) Engineering properties and mechanics of rocks and soil; geologic materials in construction; applied geophysics for subsurface exploration; groundwater engineering problems; dams, tunnels, mines, shoreline structures, and other special construction problems; erosion and mass wasting. Regularly scheduled laboratory.

Prerequisite: GEOL 102; MATHS 112 or permission of the department chairperson.

Not open to students who have credit in GEOL 416.

520 Geological and Physical Oceanography. (3) Description of geological and physical characteristics of the oceans, marine processes, and related topics.

Prerequisite: GEOL 101 or its high school equivalent or permission of the department chairperson.

Not open to students who have credit in GEOL 420.

525 Geophysics. (3) An introduction to the physics of the earth and the geophysical sciences. Refraction and reflection seismology, magnetic, electrical, gravity, radioactivity, and geothermal methods are included in lecture topics, laboratory exercises, and field investigations. Emphasizes the application of geophysical methods to energy, mineral and ground-water exploration, site evaluation, pollution detection, and other applied problems.

Not open to students who have credit in GEOL 425.

535 Stratigraphy and Subsurface Methods. (3) Principles and practices of lithostratigraphy, biostratigraphy, and sequence stratigraphy. Use of surface and subsurface stratigraphic data in the reconstruction of depositional environments and sedimentary basins.

Prerequisite: GEOL 102, 220, 310, or permission of the department chairperson.

Not open to students who have credit in GEOL 435.

Open only to graduate students.

545 Fractals in the Natural Sciences. (3) Fractal geometric models and data analysis methods of practical use in the sciences. Application examples drawn from geosciences and other natural science fields. Divider, box, size-number, variogram, and rescaled range methods, along with other techniques. Discussion of chaos and self-organized criticality as possible sources of fractals in nature.

Prerequisite: MATHS 108.

Not open to students who have credit in GEOL 445.

550 Geology of Indiana. (3) Rocks, structure, fossils, landforms, economic resources, and geologic history of Indiana. Designed for students, particularly teachers, not majoring in the earth sciences. Field-trip oriented with collection of rock, mineral, and fossil specimens.

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

Not open to students who have credit in GEOL 450.

560 Hydrogeology. (3) Occurrence and movement of surface water and groundwater, with special reference to the effect of the geologic environment.

Prerequisite: GEOL 102 or 207 or 240 or NREM 211; MATHS 108 or permission of the department chairperson.

Not open to students who have credit in GEOL 460.

570 Groundwater Geochemistry. (3) Introduces the processes controlling the composition of natural waters; streams, lakes, oceans, and near-surface groundwaters. Focuses on the effect of human activities, biological systems, and inorganic geochemistry processes on water chemistry.

Prerequisite: GEOL 101; CHEM 111, 112; or permission of the department chairperson.

Not open to students who have credit in GEOL 470.

571 Volcanology and Volcanic Hazards. (3) Designed to give middle and upper level students a working knowledge of the causes and effects of the various types of volcanism ranging from quiescent Hawaiian-style volcanoes to the explosive SW Pacific volcanoes. In addition, looks at volcanic prediction, monitoring, and hazard response programs.

Prerequisite: GEOL 102 or permission of the department chairperson.

575 Glacial Geology. (3) In-depth study of the physical nature of glaciers, their deposits, and the erosional and depositional landforms they create. Introduction to the glacial history of the north central United States. Term paper required.

Prerequisite: GEOL 240; PHYCS 110 or 120; or permission of the department chairperson.

Not open to students who have credit in GEOL 475.

580 Special Studies and Field Problems. (1–3) Selected detailed geologic problems under the guidance of a qualified instructor.

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.

583 Geology Field Camp. (6) Advanced application of field techniques to the resolution of geologic problems. Assignments include accumulation and interpretation of field observations and preparation of geologic maps, cross sections, and stratigraphic sections. Five-week summer course in the Rocky Mountains.

Prerequisite: permission of the department chairperson.

590 Computer Applications in the Geosciences. (1) Survey of the various computer applications in the geosciences. Designed to supplement existing geoscience and computer science courses by providing opportunity to gain experience working with BASIC and FORTRAN programs in various geoscience data collection, calculation, and graphic display applications.

A total of 3 hours of credit may be earned, but no more than 1 in any one semester or term.

Not open to students who have credit in GEOL 290.

600 Seminar in Geology. (1–3) Review and discussion of the literature related to a selected topic of current interest in geological research. Laboratory work and field trips may be included when necessary.

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

601 Seminar in Environmental Geology. (1–3) Review and discussion of the literature related to a selected topic of current interest in environmental geology. Laboratory work and field trips may be included when necessary.

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

605 Seminar in Stratigraphy. (3) Discussion of current topics in stratigraphy. Subjects may include global correlation, the record of sea level change, and global events in earth history.

610 Seminar in Sedimentary Petrology. (3) Advanced coverage of sedimentary rocks, their constituents, their environments of deposition, and the diagenetic processes that alter them after deposition. Proficiency in recognition of sedimentary constituents, in naming sedimentary rock types, and in interpretation of depositional, diagenetic, and provenance processes is expected.

Prerequisite: GEOL 412 or 512 or permission of the instructor.

611 Regional Geology. (3) Geologic history, geomorphology, structural geology, and special geologic topics of selected regions.

626 Seminar in Tectonics. (3) Origin and nature of tectonic processes affecting the crust and lithosphere. Plate dynamics and the tectonic evolution of orogens from a structural, petrologic, and geochronologic perspective.

Prerequisite: GEOL 315, 410, or 510 or permission of the instructor.

660 Seminar in Advanced Hydrogeology. (3) Seminar in advanced and contemporary topics in groundwater geology such as pump and slug test analyses, analytic or numerical flow and transport computer modeling, wellhead protection policy, current groundwater resource and water quality research, and groundwater remediation.

Prerequisite: GEOL 460 or 560; permission of the department chairperson.

670 Seminar in Environmental Geochemistry. (3) Seminar in advanced and contemporary topics in aqueous geochemistry such as geochemical cycling with focus on the role of sediments, soils, freshwater streams and lakes, and oceans as reservoirs for chemical compounds, including natural and manmade contaminants.

Prerequisite: GEOL 470 or 570 or permission of the department chairperson.

671 Seminar in Geomorphology. (3) Review and critical discussion of key classic and recent literature in geomorphology. Student presentations and group project.

680 Special Studies and Field Problems. (1–3) Selected detailed geologic problems under the guidance of a qualified instructor.

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.

685 Geology Research Methods. (3) Introduction to the use of scientific literature, design of research, analysis of data, and writing of research/grant proposals in a focused area of the geosciences. Review of literature pertinent to a special topic of student interest.

HISTORY

www.bsu.edu/history

Burkhardt Building 200, (765) 285-8700
Chairperson: Bruce Geelhoed
Coordinator of MA in History: Christopher Thompson
Coordinator of MA in Social Science: Dean Cantu

Graduate Faculty: Beswick, Cantu, Connolly, Dmitriev, Doyle, Edmonds, Geelhoed, Glen, K. Hall, R. Hall, Littell-Lamb, Malone, Mjagkij, Morris, Nathans, Nelson, Smith, Stephan, Suppe, Swope, Terry, Thompson, Zhuck, Zimmerman

PROGRAMS

The master of arts (MA) in history and in social science may serve as terminal degrees or as preludes to additional graduate degrees. In addition, either of the two degrees may be used to professionalize the standard secondary school teaching license. See Social Studies, page 207.

MASTER OF ARTS IN HISTORY

Admission

Applicants must meet the admission requirements of the Graduate School. In addition, applicants normally should have earned a 3.0 grade point average on a 4.0 scale in a minimum of 18 semester hours (or the equivalent) in history courses. To qualify for graduate assistantships in the department, applicants must take the general and subject (history) tests of the Graduate Record Examination (GRE) and ordinarily have undergraduate grade point averages of at least 3.0 on a 4.0 scale. Each applicant should submit a 300–500 word statement concerning goals and interests.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Required Core			
HIST	612	Sem Historio	3
	613	Sem Hist Res	3

Directed electives

A minimum of four courses in American, European, and/or world history distributed over a minimum of two areas. Students must select from the following courses:

American History			
HIST	621	Amer to 1877 (3)	
	622	Amer frm 1877 (3)	
	623	Spec Top Am (3–6)	
European History			
HIST	631	Std Erly Eur (3)	
	632	Std Mod Eur (3)	
	633	Spec Top Eur (3–6)	
World History			
HIST	641	Std Wrld His (3–6)	12
Three 500- or 600-level courses in history or with approval in related fields			9
			27 hrs

Thesis option

In general, students intending to continue their graduate education must complete a thesis			
THES	698	Thesis (1–6)	6

General option

In general, students working toward a terminal degree in history may write a thesis or complete 6 additional hours of 600-level course work in lieu of a thesis			6
			33 hrs

Comprehensive Examination

All students are required to take two three-hour written examinations in two areas of history as well as a one-hour oral examination covering the two areas. In addition, a student writing an MA thesis will have a one-hour oral defense of the thesis.

HISTORY (HIST)

500 Colonial America, 1492–1756. (3) The settlement of North America by the British and the evolution of the distinctive colonial societies that formed the foundations of the United States.

Not open to students who have credit in HIST 400.

501 The American Revolution, 1756–1789. (3) Transformation of American society and politics in the era of the American Revolution with emphasis on the origins of the revolution, the development of a democratic society, and the Constitution of the United States.

Not open to students who have credit in HIST 401.

503 The Rise of Nationalism in the United States, 1789–1824. (3) The

foundations of the United States as a new nation with emphasis on the major social, political, economic, and diplomatic events of the period.

Not open to students who have credit in HIST 403.

505 Nationalism versus Sectionalism in the United States, 1820–1860. (3) The major social, political, economic, and cultural developments in the United States with emphasis on the major leaders and events involved in the sectional conflict leading to the Civil War, 1820–1860.

Not open to students who have credit in HIST 405.

507 The American Civil War and Reconstruction. (3) Events, leaders, and movements, with special emphasis on causes, interpretation, and historiography of the period of national crisis and war followed by national reconstruction.

Not open to students who have credit in HIST 407.

509 Progressivism and Imperialism: The United States, 1878–1918. (3) America's rise to world significance at home and abroad between 1878 and 1918; the political, social, and economic problems and various efforts at reform.

Not open to students who have credit in HIST 409.

511 The United States from World War I through World War II. (3) An examination of the reaction of the American people to a society changing rapidly under the impact of two major wars, the Great Depression, and continuing industrialization and urbanization.

Not open to students who have credit in HIST 411.

513 Recent United States History: 1945 to the Present. (3) The role of the United States in the modern world. Examines the efforts of Americans to preserve a society that is prosperous and humane while it adjusts to technological change and continuing social and intellectual ferment.

Not open to students who have credit in HIST 413.

515 History of Indiana. (3) Exploration, colonization, and development of the state from the earliest time to the present.

Prerequisite: 6 hours of credit in United States history.

Not open to students who have credit in HIST 415.

516 History of the Antebellum South. (3) History, institutions, political themes, and problems of the antebellum South.

Not open to students who have credit in HIST 416.

517 History of the New South. (3) Reconstruction, industrial and agricultural progress, social life, and the new leadership after 1865.

Not open to students who have credit in HIST 417.

519 The Trans-Mississippi Frontier. (3) American territorial expansion in the region west of the Mississippi River, with emphasis on the nineteenth century. Exploration, the movement of settlers, the events that influenced their migration, and the effect of these events and the frontier on national development.

Not open to students who have credit in HIST 419.

520 The African American Experience in America. (3) The African American experience in America from the sixteenth century to the present. Emphasizes the effect of African Americans on American culture and vice versa.

Not open to students who have credit in HIST 210.

521 Indians in United States History. (3) Indian and white relations from 1492 to the present; the Indian wars, treaty making, various types of Indian and Caucasian interaction, and the development of federal and state Indian policy.

Not open to students who have credit in HIST 421.

529 Colloquium in Latin American History. (3–6) Selected topics in the history of Mexico, the Caribbean, and the Spanish borderlands.

A total of 6 hours of credit may be earned.

530 United States Diplomatic History to 1914. (3) History of United States diplomacy from the late colonial period to the eve of World War I.

Not open to students who have credit in HIST 430.

532 United States Diplomatic History since 1914. (3) The foreign relations of the United States since the outbreak of World War I.

Not open to students who have credit in HIST 432.

533 American Life and Thought, 1607–1865. (3) American social, intellectual, and cultural history from the colonial period to the Civil War, including such topics as religion, women, the family, ethnic groups, minorities, the arts, thought, popular culture, and everyday life.

Not open to students who have credit in HIST 433.

534 American Life and Thought, 1865 to the Present. (3) American social, intellectual, and cultural history from Reconstruction to the present, including such topics as religion, women, the family, ethnic groups, minorities, the arts, thought, popular culture, and everyday life.

Not open to students who have credit in HIST 434.

535 American History through Film. (3) Introduces the techniques needed to analyze films as primary documents in United States history. Focuses on the most significant feature and documentary films of American society. Compares and contrasts filmic and historical reality.

Not open to students who have credit in HIST 435.

538 Colloquium on United States Urban History. (3) The literature of American urban history, presented topically rather than chronologically. Students will select readings from a list compiled especially for the course and tailored to the exact number of students. They will then discuss their own special assignments each week so that greater exposure and interchange will be possible.

541 Comparative Slavery. (3) Explores the types of bondage, unfree labor systems, and slavery and the slave trade throughout African history as well as in a number of geographical regions for comparison. Includes Africa, the Mediterranean, the Caribbean, and Central and South America.

Prerequisite: permission of the department chairperson.

Not open to students who have credit in HIST 441.

549 American Culture Field Studies. (3–6) American culture, its art, economic life, educational systems, geography, history, industry, languages, music, and society. Students will travel through designated areas in North America. Before the trip, considerable reading in various fields pertinent to the course will be required. At the conclusion, papers will be required.

A total of 6 hours of credit may be earned.

Not open to students who have credit in HIST 449.

553 Modern Western Culture. (3–6) Selected studies in the development of cultural and intellectual movements in the fine arts, literature, scholarship, political and economic thought, science, and social reform from the eighteenth century to the present. Emphasizes themes and problems of major significance.

A total of 6 hours of credit may be earned.

554 The Era of World War I, 1870–1918. (3) The background, immediate causes, and course of the First World War with special attention to nationalism, the alliance system, imperialism, militarism, and conflicts of interest and aspirations.

Not open to students who have credit in HIST 454.

555 The Era of World War II, 1918–1945. (3) The origins, immediate causes, and the course of the Second World War with stress on the peace settlement of 1919, revisionism, diplomatic conflicts, and the foundations of the postwar world.

Not open to students who have credit in HIST 455.

556 Cold War and Europe since 1945. (3) European origin of the Cold War and rebirth of a "new" but divided Europe with stress on East-West conflict, power blocs, international relations, and temporary decline of European influence; ideological, political, economic, and social development, including competition between Western and Sovietized Eastern Europe.

Not open to students who have credit in HIST 456.

558 Strategy and Diplomacy of the European Great Powers Since 1860. (3) Examines, interprets, and evaluates British, German, Russian, French, Italian, and Austrian strategy and diplomacy—and economic, geographic, ideological, and military foundations of national power—focusing upon the "German Question," Eurocentrism,

imperialism, two world wars, renewed multipolarity, the European Community, and the Cold War.

Not open to students who have credit in HIST 458 or EURO 458.

559 The Jews in Europe and the Middle East, 1098 to the Present. (3) Survey of the Jewish role in European and Middle Eastern history and society. Focus will be on the commonalities and differences between Judaism, Christianity, and Islam and changing attitudes toward the Jewish community in the nineteenth and twentieth centuries.

Not open to students who have credit in HIST 459.

561 Development of Greek Civilization. (3) Greek political, social, and intellectual development in the Hellenic and Hellenistic periods. Emphasizes the rise and fall of Greek democracy and Greek contributions to the civilization and cultures of the West.

Not open to students who have credit in HIST 461.

562 Development of Roman Civilization. (3) Political, social, and intellectual development of Rome from the beginning of the republic to approximately A.D. 500. Emphasizes development of Roman characteristics during the republic, effects of Greek ideas and imperial expansion, and Roman contributions to Western civilization.

Not open to students who have credit in HIST 462.

564 Development of Byzantine Civilization. (3) Political, socioeconomic, and intellectual development of the Byzantine Empire from its origins to 1453. Emphasizes Byzantine religious and cultural contributions and relations with Western Europe, the Slavic peoples, and the Muslim world.

Not open to students who have credit in HIST 464.

565 Medieval Ideas and Institutions. (3) Selected problems concerning the social and cultural bases of medieval civilization. Emphasizes six major institutions and themes—feudalism, chivalry, manorialism, the medieval city, the church, and the medieval university.

567 The Renaissance and Reformation, 1300–1600. (3) Specialized study of the crises, changes, and cultural achievements of Europe in an age of transition and intellectual upheaval. Individual investigations combined with a colloquium approach.

569 World Civilizations—Field Studies. (3–6) World civilizations—their history, art, economic life, educational systems, geography, industry, languages, music, and society—through varied travel programs. Advance reading and a summary paper are required to complement each year's travel program.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned.

Not open to students who have credit in HIST 469.

571 France since 1815. (3) The political, intellectual, and social development of modern France—the problems of revolution and reaction, imperial growth, republican reform and stabilization, state power and individual freedom, capitalism, and socialism.

Not open to students who have credit in HIST 471.

572 France—The Classical Age, 1461–1715. (3) The foundations and institutions of French absolutism through Louis XIV—classic culture, the monarchy, the aristocracy, the bourgeoisie, Gallican Catholicism—with emphasis on development of the ancient regime and French influence on Europe.

Not open to students who have credit in HIST 472.

573 French Revolutionary and Napoleonic Eras, 1715–1815. (3) Investigations of the causes of the French Revolution—the great turning point of modern civilization—with particular stress on nationalism, authority, individual freedom, reform measures, social change, and other significant forces.

Not open to students who have credit in HIST 473.

575 Britain, 1485–1714. (3) A survey of the political, social, and economic history of England in the Tudor and Stuart periods. Emphasizes the rise of the national state, religious conflicts, the development of the power of Parliament, and overseas exploration and colonization.

Not open to students who have credit in HIST 475.

576 Britain, 1714 to the Present. (3) Survey of the many changes in British life from the Hanoverian period to the present—modernization of political institutions, evolution of the limited monarchy, industrialization and social conflict, effects of imperialism and recent wars, problems of government and society since World War II.

Not open to students who have credit in HIST 476.

577 Topics in English Constitutional History. (3) Selected topics concerning the constitutional history of England, such as the development of the kingship, the common law, Parliament, the Tudor and Stuart theories of government, the cabinet system, and political parties.

Not open to students who have credit in HIST 477.

581 Modern Germany. (3) Critical problems in modern German history with concentration on unification and the age of Bismarck, the First World War, cultural and intellectual ferment, Hitler and the Nazi period, and postwar West and East Germany.

Not open to students who have credit in HIST 481.

582 Research on the History of the Celtic Peoples. (3) Surveys the entire chronological and geographical framework of the history of the Celtic peoples and their distinctive and persistent culture. Introduces recent scholarship and graduate-level research on a topic of the student's choice.

Not open to students who have credit in HIST 482.

583 Research in Irish History. (3) Surveys the entire span of Irish history and introduces recent historiography and graduate-level research on a topic of the student's choice.

Not open to students who have credit in HIST 483.

584 Southern Africa. (3) Explores the arrival of the Europeans in the southern tip of Africa from 1652 and focuses on the subsequent four centuries of colonial domination of much of the southern African continent. Also investigates Black, Indian, and Colored resistance.

Prerequisite: permission of the department chairperson.

Not open to students who have credit in HIST 484.

586 Tzarist Russia. (3) Development of the Russian state and people from about 1500 to the Revolution of 1917—evolution of political institutions, cultural and religious life, economic and social change, geographic expansion, and foreign affairs.

Not open to students who have credit in HIST 486.

587 The Soviet Union. (3) The development of the Soviet Union from the Bolshevik Revolution of 1917 to the present, with emphasis on Soviet political and economic institutions and the role of the U.S.S.R. in world affairs.

Not open to students who have credit in HIST 487.

588 History of South Asia. (3) Descriptive and analytical survey of the subcontinent of South Asia, comprising India, Pakistan, Bangladesh, and Sri Lanka, from early times to the present.

Not open to students who have credit in HIST 488.

589 History of Southeast Asia. (3) History of the region from earliest times to the present, with special attention to the formation of the earliest civilizations; the influence of Indian, Chinese, and European cultures upon the people of Southeast Asia; and the processes of synthesis that have taken place within these civilizations through the centuries.

Not open to students who have credit in HIST 489.

591 Topics in Middle Eastern History. (3) Selected issues and problems in the Middle Eastern world since Muhammad. Topics may include the expansion of Islam, slavery in the Middle East, the economic and social history of the Ottoman empire, the Arab/Israeli dispute, and recent national and international crises.

Not open to students who have credit in HIST 491.

592 History of China to 1600. (3) Descriptive and analytical survey of China's history from earliest times to roughly A.D. 1600, with emphasis on the development of the dynastic tradition, Confucian-based society and culture, and China's focal point status in the pre-1600 world order.

Not open to students who have credit in HIST 492.

593 History of Premodern Japan. (3) Analytical survey of premodern

Japanese history to ca. 1600, focusing on the ideological, political, social, economic, and cultural developments that provide a foundation for the understanding of modern Japan.

Not open to students who have credit in HIST 493.

595 Modern China, 1600 to the Present. (3) Descriptive and analytical survey with emphasis on China's changing role as a member of the world community, its response to increased Western contacts, disintegration of traditional order, revolutionary changes through the Republic of China and the People's Republic, and significant elements of contemporary Chinese society and culture.

Not open to students who have credit in HIST 495.

596 Modern Japan, 1600 to the Present. (3) Descriptive and analytical survey of political and economic developments, foreign policy, and social and cultural change in modern Japan with emphasis on conditions contributing to its rapid modernization, nationalist and expansionist movements, and dynamic postwar recovery.

Not open to students who have credit in HIST 496.

612 Seminar in Modern Historiography. (3) A survey of the major works in the historical literature of the past five centuries, including both European and American contributions, with special investigation of significant historians and movements in historical studies and writing.

613 Seminar in Historical Research. (3) Designed to further investigative skills. Focuses on the knowledge of concepts and methodology used in historical research through the intensive study of a selected topic in American, European, or world history. A research paper is required.

Prerequisite: HIST 612; permission of the MA advisor in history.

621 Studies in American History to 1877. (3) Studies of selected problems in American history to 1877 with special attention to discussion of historiography and current trends in scholarship. Exact content will be announced before each offering.

622 Studies in American History since 1877. (3) Studies of selected problems in American history since 1877 with special attention to discussion of historiography and current trends in scholarship. Exact content will be announced before each offering.

623 Special Topics in American History. (3–6) Investigation of a particular topic, problem, or issue in American history with emphasis on topics, specialties, and materials not covered in other courses. Exact content will be announced before each offering.

A total of 6 hours of credit may be earned.

631 Studies in Early European History. (3) Studies of selected problems in early European history with special attention to discussion of historiography and current trends in scholarship. Exact content will be announced before each offering.

632 Studies in Modern European History. (3) Studies of selected problems in modern European history with special attention to discussion of historiography and current trends in scholarship. Exact content will be announced before each offering.

633 Special Topics in European History. (3–6) Investigation of a particular topic, problem, or issue in European history with emphasis on topics, specialties, and materials not covered in other courses. Exact content will be announced before each offering.

A total of 6 hours of credit may be earned.

641 Studies in World History. (3) Studies of selected problems in world history with special attention to discussion of historiography and current trends in scholarship. Exact content will be announced before each offering.

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

650 Special Studies. (1–6) Directed study of special problems by individuals or groups of students. Ordinarily not available until students have earned 12 hours of graduate credit in history.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned with permission of the department chairperson.

SOCIAL STUDIES (SS)

650 Independent Study in Social Science Education. (1–6) Directed study of special problems or research in social science education by individuals or groups of students. Topics to be investigated will be chosen after consultation with an instructor with special competence in the topic involved.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned.

670 Applying Media Resources to Social Science Education. (3) Selecting, developing, and incorporating media into a systematic plan for instruction in the social sciences. Designed to aid in the enrichment of teaching through appropriate use of instructional media.

688 Using Community Resources in Teaching Social Studies. (3) Techniques and practice in finding, analyzing, organizing, and grading materials pertaining to political, economic, and social activities of the community and their historical development for use at the various grade levels.

690 Selection and Organization of Social Studies Teaching Materials. (3) Recent curriculum materials examined in the light of learning theory, methods of teaching, content emphasis, and rationale. Criteria for comparing and evaluating curriculum materials are developed.

691 Teaching Social Studies Skills in Secondary Schools. (3) Preparation for teaching social studies skills to meet individual and group needs. Emphasizes skills related to problem solving, critical thinking, reading and interpreting materials, using pictorial representations, and finding and using information.

692 Teaching Social Studies Skills in Junior High/Middle Schools. (3) Preparation for teaching social studies skills to meet individual and group needs. Emphasizes skills related to problem solving, critical thinking, reading and interpreting materials, using pictorial representations, and finding and using information.

694 Seminar in Social Studies Curriculum and Instruction. (1–5) Research and investigative techniques will be developed through the intensive study of a topic within the framework of social studies curriculum and instruction. Some of the topics studied are goals, methodology, content, evaluation, development and revision of curricula, and teacher education in social studies. A research paper is required.

A total of 5 hours of credit may be earned.

695 Recent Trends in Teaching Secondary School Social Studies. (3) Issues and teaching strategies developed in view of the findings of current research in social science education. Considers such topics as developing goals, organizational patterns, values clarification, inquiry teaching, and evaluative procedures in teaching social studies. Designed for experienced teachers.

697 Seminar in Social Science Education. (1–5) The discussion of current issues and research in one branch of the social studies, such as value analysis, method of inquiry, critical thinking, methods in the inner city.

A total of 5 hours of credit may be earned.