



INDIANA UNIVERSITY

## University Graduate School 2008-2009

### Academic Bulletin

## Psychological and Brain Sciences

### College of Arts and Sciences Bloomington

#### Chairperson

Professor Linda B. Smith\*

#### Associate Chairperson

Professor Olaf Sporns\*

#### Director of Graduate Studies

Professor Amy Holtzworth-Munroe\*, Psychology Building 148,  
855-8159

#### Graduate Advisor and Ombudsman

Professor Meredith West\*, Psychology Building 351,  
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#### Departmental URL

[www.indiana.edu/~psych](http://www.indiana.edu/~psych)

#### Departmental E-mail

[psych@indiana.edu](mailto:psych@indiana.edu)

### Graduate Faculty

(An asterisk [\*] denotes membership in the University Graduate School faculty with the endorsement to direct doctoral dissertations.)

#### Distinguished Professors

Eliot Hearst\* (Emeritus), Robert Nosofsky\*, Richard M. Shiffrin\*

#### Jack and Linda Gill Chair

J. Michael Walker\*, Kenneth Mackie\*

#### Luther Dana Waterman Professor

Richard M. Shiffrin\*

#### Rudy Professor

Bennett Bertenthal\*, James T. Townsend\*, Stanley Wasserman\*

#### Chancellors' Professors

James C. Craig\*, Robert L. Goldstone\*, Robert Nosofsky\*, David B. Pisoni\*, George V. Rebec\*, Steven J. Sherman\*, Linda B. Smith\*

#### Distinguished Scholar

William Estes

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#### Professors Emeritus/Emerita

James Allison\*, Richard Berry\*, Alexander Buchwald\*, Jerome Chertkoff\*, Gabriel Frommer\*, S. Lee Guth\*, Kenneth Heller\*, Margaret Intons-Peterson\*, Richard McFall\*, Conrad Mueller\*, Lloyd Peterson\*, Donald Robinson\*, Richard Rose\*

#### Associate Professor Emeritus

Harold Lindman\*

#### Professors

Jeffrey R. Alberts\*, John E. Bates\*, Geoffrey Bingham\*, Sharon Brehm, Jerome R. Busemeyer\*, Thomas A. Busey\*, Joseph Farley\*, Peter Finn\*, Preston Evans Garraghty\*, Julia R. Heiman\*, Amy Holtzworth-Munroe\*, Susan S. Jones\*, John K. Kruschke\*, Brian F. O'Donnell\*, Dale R. Sengelaub\*, Eliot R. Smith\*, Olaf Sporns\*, Julie C. Stout\*, William D. Timberlake\*, Peter Todd\*, Richard Viken\*, Meredith West\*

#### Associate Professors

Jason M. Gold\*, William Hetrick\*, Edward R. Hirt\*, Luiz Pessoa\*, Cara L. Wellman\*

#### Assistant Professors

Heather Bradshaw\*, Joshua Brown\*, Brian D'Onofrio\*, Karin Harman James\*, Thomas W. James\*, Michael Jones\*, Sharlene D. Newman\*, Anne Prieto\*, Sari van Anders\*, Chen Yu\*

### Special Departmental Requirements

(See also general University Graduate School requirements.)

#### Admission Requirements

Recommended Undergraduate Background: To prepare for graduate work in psychological and brain sciences at Indiana University, students should have a general background in psychology consisting of approximately 20 credit hours in psychology, including laboratory work in psychology and statistics. Undergraduate course work in mathematics and in the biological and/or physical sciences is desirable. While it is expected that students will have a substantial background in psychology, students with backgrounds in other areas, for example, biology or mathematics, will be considered for admission on an equal basis with those students who have majored in psychology.

#### Grades

An average of at least a B+ (3.3) must be maintained in all course work. No grades below B- (2.7) may be counted toward degree requirements. Students with a GPA below 3.3 or receiving more than one grade below B- (2.7) may be subject to academic probation and dismissal.

## Master of Arts Degree

Normally the department accepts only Ph.D. students, but under unusual circumstances, applicants are considered for a M.A. degree only. Students accepted for a M.A. normally are not provided with financial support by the department. Students completing the M.A. program are not ensured acceptance into the Ph.D. program and will be evaluated in comparison with all other applicants to the Ph.D. program. No training program in clinical psychology is offered at the master's level.

### Course Requirements

A total of 30 credit hours including a core consisting of P553 and P595, and one graduate course in four areas of specialization in the department. A GPA of at least 3.3 must be maintained (see general department guidelines for grades above).

### Masters Thesis

Required. Students must be consistently involved in productive research throughout their course of graduate study. Students who are determined, by their faculty advisory committee, not to be making adequate research progress may be subject to academic probation and dismissal.

## Doctor of Philosophy Degree

### Research

To remain in good standing, students must be consistently involved in productive research throughout their course of graduate study. Students are judged on research potential and productivity, as well as on course work. All students are expected to develop research skills appropriate to their programs through a combination of course work, individual study, and experience. One substantial research project must be completed and formally approved by the student's advisory committee before the end of the third semester. A second substantial research project must be completed and approved by the end of the fifth semester. Student research progress will be evaluated annually by the student's advisory and research committees, which will examine progress on first and second research projects, the dissertation research project, and involvement in other research projects. Students who fail to make adequate research progress at any point may be subject to academic probation and dismissal.

### Course Requirements

A total of 90 credit hours, including dissertation. Students must complete the department core courses: P553, P554, P595, and P660. Also required are course selections from the student's area of specialization, usually consisting of approximately 12 credit hours from a selection of core courses in a student's major area of study. Unless pursuing a double major, the student is also required to complete a minor. In addition, students are expected to complete one graduate course in two areas outside the student's specialization and minor areas (or outside both majors, in the case of a double major). Up to two additional courses may be specified by the student's advisory committee at any time before the Qualifying Exam has been successfully passed.

In addition, students completing the APA approved Program in Clinical Psychology must complete two clinical elective courses, at least 6 hours of P690 (practicum training), a one-year internship approved by the clinical science program, and must demonstrate competence in APA specified areas of broad and general training in psychology.

Failure to complete required courses within a timeframe specified by the student's advisory committee may make a student subject to academic probation and dismissal.

### Minor

Doctoral students pursuing a single major may choose to minor outside of the department or to take an in-depth minor within the Department of Psychological and Brain Sciences. If a minor outside the department is elected, the requirements are specified by that unit. An in-depth minor within the department consists of 9 credit hours of graduate course work in an area of psychological and brain sciences other than that of the major. The specific courses making up such a minor must be approved by the student's advisory committee. Students pursuing a double major are not required to complete a minor (see General Requirements section of the Graduate Bulletin).

### Other Provision

All students are required to serve one year as associate instructors or obtain equivalent teaching experience as approved by the department chair or Director of Graduate Studies.

### Qualifying Examination

Written and oral portions of the qualifying exam must be successfully passed by the beginning of the fifth regular semester of residency. Students with a double major may request one additional year before they take the qualifying examination and must successfully pass the exam by the beginning of the seventh regular semester of residency (see General Requirements section of the Graduate Bulletin). Students who do not pass the qualifying exam will be given an opportunity to retake the exam within one semester (i.e., by the end of the fifth semester or for double majors by the end of the seventh semester). Students who do not successfully pass their second attempt at the qualifying examination will be subject to dismissal.

### Advisory and Research Committees

Students must identify a major advisor and have an advisor throughout the course of their graduate studies. Student must form an advisory committee by the end of their second semester; later in their course of study, students must form a research (dissertation) committee. The student's committee (advisory or research) shall consult with the student, at least once per year, to help determine the student's course of graduate study, develop a research program, approve the student's course selections, and review the student's progress in all areas (for example, but not limited to: completion of required courses, course grades, adequacy of teaching, and research progress). The student's committee will determine whether or not the student is making adequate progress in all areas. Should the advisory (or research) committee determine that a student is not making adequate progress in any area, this may

be grounds for eliminating a student's department funding, probation, or dismissal from the program.

### **Ph.D. Minor in Psychological and Brain Sciences**

Doctoral students in other departments may elect psychological and brain sciences as an outside minor. A minimum of four courses at the 400 level or above is required. The student must achieve a grade of at least B- in each course and an overall grade point average of at least 3.0. The specific courses must be approved by a faculty advisor who is a faculty member within the Psychological and Brain Sciences department and may include no more than one research course (P895).

### **Accreditation Status**

The Clinical Science Program in the Department of Psychological and Brain Sciences at Indiana University has been accredited continuously since 1948 by the American Psychological Association Committee on Accreditation. For further information on the program's status you may contact: Committee on Accreditation c/o Office of Program Consultation and Accreditation Education Directorate American Psychological Association 750 First Street NE Washington, DC 20002-4242, (202) 336-5979

## **Courses**

Courses in the department numbered below P400 are not acceptable as credit toward a graduate degree in psychological and brain sciences. Students in the psychology Ph.D. program may not take a 400-level course for graduate credit if an equivalent higher-level graduate course is available. The following P400 level courses are acceptable as credit toward a graduate degree in psychological and brain sciences, if an equivalent higher-level course is not available.

- P412 Laboratory in Human Performance (3 cr.)**
- P417 Animal Behavior (3 cr.)**
- P421 Laboratory in Social Psychology (3 cr.)**
- P423 Human Neuropsychology (3 cr.)**
- P424 Laboratory in Sensation and Perception (3 cr.)**
- P425 Behavior Disorders of Childhood and Adolescence (3 cr.)**
- P426 Laboratory in Behavioral Neuroscience (3 cr.)**
- P429 Laboratory in Developmental Psychology (3 cr.)**
- P434 Community Psychology (3 cr.)**
- P435 Laboratory in Human Learning and Cognition (3 cr.)**
- P436 Laboratory in Animal Learning and Motivation (3 cr.)**
- P438 Language and Cognition (3 cr.)**
- P459 History and Systems of Psychology (3 cr.)**
- P460 Women: A Psychological Perspective (3 cr.)**

Undergraduates may, by consent of the instructor, register in and receive credit for graduate courses (number P500 and above). Ordinarily such consent is not granted unless the student has completed 20 credit hours of psychology.

**P500 Psychology for Graduate Students (3 cr.)** P: Graduate standing or consent of instructor. Basic psychological principles. For students with little or no previous training in psychology.

**P501 Research Issues in Clinical Psychology (3 cr.)** P: Graduate standing in psychology or consent of instructor. A research-oriented survey of psychopathy, assessment, and psychotherapy. Models of psychological disorder; strategies of etiological research; test construction and clinical prediction; research on process and outcomes of psychotherapy. Credit not given for both P501 and P530.

**P502 Developmental Psychology (3 cr.)** An advanced introduction to the theory and experimental analysis of ontogenetic processes. Special emphasis on human development.

**P503 Complex Cognitive Processes (3 cr.)** P: Graduate standing in psychology or consent of instructor. A survey of topics in human information processing, including attention, short-term storage, long-term retention, retrieval from memory, concept attainment, problem solving, speech perception, and psycholinguistics.

**P504 Learning and Motivation (3 cr.)** P: Graduate standing in psychology or consent of instructor. Introduction to theory and experimental literature in learning and motivation. Focus on nonhuman behavior.

**P506 Sensory Psychology (3 cr.)** P: Graduate standing in psychology or consent of instructor. Introduction to methods and research in sensory psychology.

**P507 Theories of Learning (3 cr.)** Survey, comparison, and critical analysis of modern theories of learning, from Thorndike to present.

**P510 Principles of Research in Psychology (3 cr.)** Principles of construction and testing of psychological theories; experimental and nonexperimental designs; requirements of valid inference; measurement of psychological constructs; research methods including laboratory studies, surveys, observation methods.

**P514 Methods in Biopsychology (2 cr.)** P: K300 or equivalent, course in laboratory psychology. Training in research techniques in sensory and physiological psychology.

**P517 Methods in the Direct Observation of Behavior (3 cr.)** P: P553 or its equivalent. Reviews current use of observational techniques in the study of animal and human behavior, and critically considers the development of coding schemes and strategies of data recording and analysis.

**P519 Current Theories of Personality (3 cr.)** P: Graduate standing, consent of instructor. Original writings of major contemporary theorists of personality.

**P525 Classical Conditioning (3 cr.)** Critical evaluation of experimental literature. Emphasis on methodological and theoretical issues.

**P526 Neurobiology of Learning and Memory (3 cr.)** Comprehensive survey of the cellular and molecular bases of associative and nonassociative forms of learning and memory. Verte-

brate and invertebrate model systems and preparations as well as data obtained from the human neuropsychology literature will be studied.

**P527 Developmental Psychobiology (3 cr.)** Ontogeny of sensory-motor behavior and its underlying anatomical and physiological development.

**P528 Experimental Analysis of Economic Behavior (3 cr.)**  
P: Graduate standing or permission of instructor. Relations between experimental psychology and microeconomics: basic concepts, theory, and research.

**P530 Clinical Psychology (3 cr.)** P: Graduate standing and consent of instructor. Introduction to clinical psychology as an experimental-behavioral science, with an emphasis on theoretical, methodological, and ethical issues basic to clinical research and professional practice.

**P533 Introduction to Bayesian Data Analysis I (3 cr.)** P: Basic calculus (e.g., MATH M212 or equiv.) and computer programming (e.g., CSCI A201 or equivalent). Introduction to Bayesian analysis of data from simple experiment designs using hierarchical models and Monte Carlo methods.

**P534 Introduction to Bayesian Data Analysis II (3 cr.)** P: Basic calculus (e.g., MATH M212 or equiv.) and computer programming (e.g., CSCI A201 or equivalent). Introduction to Bayesian analysis of data from simple experiment designs using hierarchical models and Monte Carlo methods.

**P536 Theory of Tests and Measurements (3 cr.)** P: P553. Survey of test and measurement procedures; classical test theories, statistical theories; models of tests.

**P540 Principles of Psychological Assessment and Prediction (3 cr.)** P: P553-P554 or equivalent. Concepts of validity and reliability. Diagnostic devices viewed as bases for decisions. Classification. Comparison of methods of making predictions about individuals.

**P553-P554 Advanced Statistics in Psychology I-II (3-3 cr.)**  
P: K300 or equivalent. Statistical inference applied to problems in psychological research. Experimental design and data interpretation. Elementary probability theory, statistical distribution, classical and nonparametric tests of hypotheses, point and interval estimation. Relations between statistical models and experimental controls.

**P557 Representation of Structure in Psychological Data (3 cr.)**  
P: P553 or consent of instructor. Survey of multidimensional scaling, clustering, choice theory, and signal detection approaches to modeling similarity and classification. Theory and application.

**P564 Psychophysics (3 cr.)** Classical and modern methods for investigation of sensory-perceptual processes. Application of signal detectability theory to psychophysics; emphasis on current research on detection and recognition of auditory signals in noise.

**P565 Psychophysics of Vision (3 cr.)** Critical evaluation of research literature on visual functions of brightness, color, and spatial discrimination.

**P590 Readings in Psychological and Brain Sciences (1-6 cr.)**  
Readings and study in special topics of Psychological and Brain Sciences with guidance from a member, or members, of the faculty.

**P595 First-Year Research Seminar (2-3 cr.)** Presentation and discussion of first-year graduate student research projects.

**P605 Introduction to Mathematical Psychology (3 cr.)** P: P553 or consent of instructor. Current applications of mathematics to psychology.

**P615 Developmental Psychology I (3 cr.)** An analysis of developmental processes in humans and nonhumans. Emphasis on the study of mechanisms that control the ontogeny of sensory, motor, cognitive, and language systems.

**P620 Attitudes and Attitude Change (3 cr.)** P: P320, P511, or consent of instructor. Conceptions of the attitude construct and theories of attitude formation and change.

**P623 Psychology of Language (3 cr.)** Psycholinguistic events, including communicative speech, gestures, and symbolic behavior. Interrelations between linguistic and other psychological processes in individual and social situations.

**P624 Principles of Psychopathology (3 cr.)** P: Graduate standing and consent of instructor. Description of the phenomena of psychopathology and the principles associated with their classification.

**P625 Operant Conditioning (3 cr.)** A survey and interpretation of research findings on problems of systematic interest for a general science of behavior, with emphasis on recent work.

**P631 Intervention and Evaluation (3 cr.)** P: Consent of instructor. A systematic comparison of theories of psychotherapy and behavior change. Introduction to evaluation techniques appropriate to applied settings.

**P634 Advanced Survey of Community Psychology (3 cr.)**  
P: 15 credit hours of psychology or consent of instructor. A survey of issues and research in community psychology. Topics covered include the role of conceptual models in guiding intervention practices; research in social epidemiology, prevention, consultation, and organizational and community change.

**P637 Neurobiology of Addictions (3 cr.)** P: N500 and N501 and N612 (or permission of instructor). P637 provides students an intensive overview of the fundamentals, state-of-the-art advances, new frontiers, and major gaps in our understanding of the neurobiology of addiction. Applicable to understanding the study of drug/substance and addiction, cellular processes of learning and memory, neuroadaptation, motivation and reward, etc. within neuroscience and psychology.

**P638 Experimental Psychology of Reading (3 cr.)** Examination of the component stages of the reading process. Focuses on how visual information is processed within the framework of information processing and psycholinguistics. Topics to be considered include alphabets, phonetics and phonology, letter recognition, word and sentence processing, cognitive bases of reading, and methods currently employed in teaching reading.

**P641 Assessment (3 cr.)** P: Consent of instructor. Review of research and theory on methods of gathering information about individuals.

**P644 Attention and Short-Term Memory (3 cr.)** Analysis of the experimental literature and theories of human attention and short-term memory, including visual and verbal systems and forgetting.

**P645 Learning and Long-Term Memory (3 cr.)** Analysis of the experimental literature and theories of human learning and long-term memory, including forgetting, organization, sentence memory, and nonverbal memory.

**P647 Decision Making under Uncertainty (3 cr.)** P: P553 or consent of instructor. Detailed survey of decision making under uncertainty. Theories, data, and application of decision making in situations involving imperfect (probabilistic) information; preference and inference in judgment. Applications covered include learning, risky choice, diagnostic decisions, group decisions.

**P648 Choice Behavior (3 cr.)** P: P553 or consent of instructor. Preferential choice under conditions of certainty. Critical review of the properties and limitations of current theories of choice and scaling.

**P650 Neuroimaging: Theory and Methods (3 cr.)** Covers theory and methods of neuroimaging with a particular emphasis on functional MRI. Specific topics include experimental design, data acquisition, data analysis, data interpretation, and data presentation. Also covers introductory MR physics and the physiology of blood oxygen-level dependent (BOLD) changes.

**P651 Perception/Action (3 cr.)** P: Consent of instructor. Coverage includes event perception, optical flow analysis (aperture problem, correspondence problem, structure from motion, sensory psychophysics, contact with machine vision), problems in motor coordination and control (motor equivalence, degrees of freedom problem, contact with physiology of movement and robotics). Focus on the relation between perception and action.

**P654 Multivariate Analysis (3 cr.)** P: P553-P554. Survey of multivariate statistical methods; partial, multiple, and canonical correlation, factor analysis, discriminant analysis, classification procedures, profile analysis, and multivariate analysis of variance.

**P657 Topical Seminar (cr. arr.)** Topics of current interest, with intensive critical examination of appropriate literature. Different staff member in charge each semester.

**P658-P659 Mathematical Models in Psychology I-II (4-4 cr.)** P: P605 or consent of instructor. Intensive study of mathematical models employed in experimental psychology: learning, perception, reaction time, social processes. Emphasis on probability methods.

**P660 The Teaching of Psychology (1 cr.)** Open to advanced graduate students. Problems of selection, organization, and presentation of psychological knowledge to undergraduates. Emphasis on introductory lecture and laboratory courses.

**P667 Neuropsychopharmacology (3 cr.)** Analysis of neural mechanisms of drug effects on animal and human behavior, based on behavioral and biological experiments.

**P669 Neurobiology of Behavioral Disorders (3 cr.)** P: N500 and N501, and at least one other graduate course in neuroscience or behavioral neuroscience. Neural mechanisms underlying selected neurological and psychological dysfunctions.

**P686-P687 Current Psychological Literature I-II (1-1 cr.)** Review of current psychological journals.

**P690 Practicum in Clinical Psychology (cr. arr.)** P: Consent of instructor.

**P695 Second-Year Research Seminar (1-2 cr.)** Presentation and discussion of second-year graduate student research projects.

**P700 Research and Theory in Social Psychology (0-2 cr.)** P: Consent of instructor. Four semesters required for graduate students in Social Psychology, one for credit. Meets weekly. Invited speakers will sometimes present colloquia. Students taking the course for 1 credit will be required to participate in discussions and readings. For 2 credits, students will be required to make a presentation. Mostly, students will present their own research.

**P701 Research and Theory in Developmental Science (0-2 cr.)** Four semesters required for PhD students in Developmental Psychology. Meets weekly. All students must present at least once a semester. Most will present their own research.

**P717 Evolutionary Bases of Learning (3 cr.)** P: Written consent of instructor. Examines learning as an evolved ability which equips organisms to deal with predictable variability in the environment. Compares ethological, comparative, and general process approaches to the study of learning.

**P720 Dyadic Interaction (3 cr.)** P: P320, P511, or consent of instructor. General models of dyadic interaction; theories and research on affiliation, interpersonal attraction, and the development, maintenance, and dissolution of social relationships.

**P721 Group Processes (3 cr.)** P: P320, P511, or consent of instructor. Theories and research on intergroup processes. Topics will vary but may include social identification, stigmatization, power differentials, group decision making, conformity, minority influence, norms, social dilemmas, intergroup conflict.

**P736 Child Psychopathology (3 cr.)** Seminar on serious behavior disturbances of children. Comparisons with development of normal child interacting with family.

**P747 Seminar in Cognitive Psychology (1-3 cr.)** Selected topics.

**P820 Social Perception (3 cr.)** P: Graduate standing in psychology or consent of instructor. Critical review of theoretical and experimental literature concerning knowledge of others as intervening variable in social behavior.

**P895 Research (cr. arr.) \*\***

**P898 Master's Degree Research (cr. arr.)\*\***

**P899 Ph.D. Degree Research (cr. arr.)\*\***

\*\*These courses are eligible for a deferred grade.