

# Department of Psychology

Michael Tarr, Department Head  
 Department Office: Baker Hall 346-C  
<http://www.cmu.edu/dietrich/psychology/index.html>

Can newborn infants perceive the world as we do, or is it just "a blooming buzzing confusion"? Do personality, beliefs and social factors influence health? How do scientists and young children make discoveries, and what abilities make these insights possible? How does brain activity reveal differences in thinking? Can computers think the way people do?

These are some of the questions that psychologists at Carnegie Mellon are trying to answer.

For the student who is majoring in Psychology, Cognitive Science or Neuroscience, studying with faculty who are on the leading edge of research on questions like the above can be a very exciting experience.

The Psychology Department at Carnegie Mellon has long been noted as one of the pioneering Psychology Departments in the world, particularly in such areas as cognitive psychology, cognitive science, social psychology, developmental psychology, cognitive neuroscience, and health psychology. The Psychology Department offers 5 majors: B.A. and B.S. degrees in Psychology, as well as a B.S. degree in Cognitive Science and together with the Department of Biological Sciences, a unified B.S. double major in Psychology and Biological Sciences, and an Intercollege major in Neuroscience.

## The Major in Psychology

Psychology is a discipline that embraces both biological and social sciences. It is a science concerned with establishing principles and laws regarding the ways in which people think and behave through the scientific study of human behavior.

The orientation of the Carnegie Mellon Psychology curriculum is toward developing highly skilled and knowledgeable graduates. About half of our graduates go on to graduate or professional school. The remainder seek to expand their problem-oriented analytic skills to qualify themselves for job opportunities beyond those typically open to liberal arts students.

Majors in the department are expected not only to learn about findings already established by psychologists, but also to become proficient in the investigation and analysis of behavior. This includes observing behavior, formulating hypotheses, designing experiments to test these hypotheses, running experiments, performing statistical analysis, and writing reports. The department has many resources for students to use in acquiring these skills. For instance, students interested in child development may be involved in the child development laboratory and observational facilities which are a part of the Carnegie Mellon Children's School which operates under the department's aegis. Students interested in health or clinical psychology might have opportunities to do internships in applied settings, and all Psychology majors have access to extensive computer facilities for data analysis and simulation work. The department also has a state of the art set of undergraduate research laboratories and computer clusters, and through the Scientific Imaging & Brain Research Center, a magnet is in use for conducting brain imaging studies using fMRI.

In addition to formal class work, students are encouraged to participate in elective research projects where they may register and receive credit for freshmen research experience course, 85-506 Readings in Psychology, Fall research experience in 85-507 Research in Psychology or Spring research experience in 85-508 Research in Psychology. In the research in psychology course, the student may work on an ongoing research projects or develop and carry out a new research project with a faculty member. There is university and departmental funding available to help support student-initiated research projects and student travel to present research results at scientific meetings and conferences. In the Readings courses, the student reads extensively on a particular topic. The faculty member and student meet to discuss the readings, and the student writes a paper on the topic selected. The Psychology Department Website (<http://www.cmu.edu/dietrich/psychology>), provides descriptions of faculty research interests (<http://www.cmu.edu/dietrich/psychology/research-areas>) that the student can use in determining who should be approached to supervise a particular research or reading project.

Students interested in gaining field work experience via a number of internship opportunities available to them can receive credit through 85-482 Internship in Psychology, 85-480 Internship in Clinical Psychology or 85-484 Practicum in Child Development. Clinical internships are available with a variety of clinical settings including the prestigious Western Psychiatric Institute and Clinic (the teaching hospital of the Department of Psychiatry at the University of Pittsburgh Medical School). During the internship, students get first-hand experience with different clinical populations. Developmental

Practicum experience is available in the department-run CMU Children's School (<http://www.cmu.edu/dietrich/psychology/centers-and-facilities>).

## Psychology Curriculum

Mathematics	19-20 units
21-111-21-112 Calculus I-II	20

or

21-120-21-122 Differential and Integral Calculus - Integration and Approximation	20
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or

21-120-21-256 Differential and Integral Calculus - Multivariate Analysis	19
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\*Students who place out of 21-120 with AP credit are only required to successfully complete 21-122 or 21-256 instead of the full two semester sequence.

\*21-124 may be substituted for 21-122 for those interested in Neuroscience or Biology.

Statistics Sequence	18 units
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36-201 Statistical Reasoning and Practice	9
36-309 Experimental Design for Behavioral and Social Sciences	9

\*In certain circumstances, 36-202 can be a substitute for 36-309 with prior approval.

Breadth Requirement	36 units
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85-102 Introduction to Psychology *	9
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Survey Courses - Complete Three

85-211 Cognitive Psychology	9
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or 85-213 Human Information Processing and Artificial Intelligence

85-219 Biological Foundations of Behavior	9
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85-221 Principles of Child Development	9
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85-241 Social Psychology	9
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85-251 Personality	9
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\* A fourth survey course can be taken in place of Introduction to Psychology

Research Methods*	18 units
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Complete two courses.

85-310 Research Methods in Cognitive Psychology	9
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85-314 Cognitive Neuroscience Research Methods	9
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85-320 Research Methods in Developmental Psychology	9
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85-330 Analytic Research Methods	9
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85-340 Research Methods in Social Psychology	9
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\* Prerequisites for all Research Methods courses: 36-309 or equivalent, and corresponding survey course.

Advanced Courses	18 units
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Advanced psychology courses exist within four areas (cognitive, cognitive neuroscience, developmental, social and health psychology.) Any advanced content course or seminar in psychology or any psychology course higher than 85-350. Exceptions for the advanced course requirement are: 85-480, 85-482, 85-484, 85-484, 85-506, 85-507, 85-508, 85-601, 85-602, 66-501, 66-502.

Computer Science Requirement	10 units
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15-110 Principles of Computing	10
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Natural Science Requirement (B.A. 18 units, B.S. 36 units, both of which include 9 units of GenEd Science)

The Psychology major requires (for B.S. candidates) three additional natural science courses (with two in the same science) beyond the College's General Education natural science requirement. For the B.A. the

requirement is one course beyond the General Education requirement in natural science.

These courses can be selected from the following areas:

03-XXX	Biology*
09-XXX	Chemistry
33-XXX	Physics

\*Given the growing relevance of biology to psychology, it is strongly recommended that for the B.S. a minimum of two courses in biology be included as part of the natural science requirement.

## Additional Major in Psychology

In order to complete an additional major in Psychology, a student must fulfill all of the Psychology major requirements within the department -- in other words, the breadth requirement, computing requirement, three survey courses at the 200-level, two research methods courses, and two advanced courses. These courses must include at least 81 units, plus calculus prerequisites and the 36-201 statistics course or equivalent and 36-309. In addition, B.S. candidates must take the three-course science requirement and B.A. candidates complete one science course beyond the GenEd requirement.

## Concentrations within the Psychology Major

Students who wish to focus their Psychology program on a specific area can do so either by the careful selection of Psychology elective courses focusing on their area of interest or by pursuing one of the following concentrations. Students must obtain a concentration form from the Undergraduate Program Coordinator, Emilie O'Leary, receive approval from their psychology faculty advisor, then returning the signed copy to Emilie in Baker Hall 339. The completion of a concentration will be recognized in the Psychology Graduation Brochure.

### Health-Psychology Concentration

For Psychology majors who wish to have a focus of their study on Health Psychology, the following courses should be selected as part of their Psychology Major in conjunction with their Psychology advisor's approval.

#### As part of the B.S. science requirement:

- 03-121 Modern Biology
- + one additional Biology course

#### As part of the psychology breadth requirement:

- 85-219 Biological Foundations of Behavior
- 85-241 Social Psychology

#### As part of the psychology Research Methods requirement:

- 85-340 Research Methods in Social Psychology

#### As part of the advanced coursework in psychology requirement, at least two of the following:

- 85-353 Mindfulness: Science and Practice
- 85-442 Health Psychology
- 85-443 Social Factors and Well-Being
- 85-446 Psychology of Gender
- 85-501 Stress, Coping and Well-Being

### Cognitive-Neuroscience Concentration

For Psychology majors who wish to have a focus of their study be on Cognitive Neuroscience, the following courses should be selected as part of their Psychology Major in conjunction with their Psychology advisor's approval.

#### As part of the B.S. Science requirement:

- 03-121 Modern Biology
- 03-363 Systems Neuroscience

#### As part of the psychology Breadth requirement:

- 85-211 Cognitive Psychology
- 85-219 Biological Foundations of Behavior

#### As part of the Research Methods requirement:

- 85-310 Research Methods in Cognitive Psychology
- 85-314 Cognitive Neuroscience Research Methods

#### As part of the advanced coursework in psychology requirement, at least two of the following:

- 85-356 Music and Mind: The Cognitive Neuroscience of Sound
- 85-370 Perception
- 85-406 Autism: Psychological and Neuroscience Perspectives
- 85-414 Cognitive Neuropsychology
- 85-419 Introduction to Parallel Distributed Processing
- 85-429 Cognitive Brain Imaging

### Developmental Psychology Concentration

For Psychology majors who wish to have a focus of their study be on Developmental Psychology, the following courses should be selected as part of their Psychology Major in conjunction with their Psychology advisor's approval.

#### As part of the B.S. science requirement:

- 03-121 Modern Biology

#### As part of the psychology Breadth requirement:

- 85-221 Principles of Child Development

#### As part of the psychology Research Methods Requirement:

- 85-320 Research Methods in Developmental Psychology

#### As part of the advanced coursework in psychology requirement, at least two of the following:

- 85-354 Infant Language Development
- 85-363 Attention, Its Development and Disorders
- 85-406 Autism: Psychological and Neuroscience Perspectives
- 85-423 Cognitive Development
- 85-425 Child Psychopathology and Treatment

#### Additional course requirement, one of the following:

- 85-484 Practicum in Child Development
- 03-350 Developmental Biology

### Cognitive Psychology Concentration

For Psychology majors who wish to have a focus of their study be on Cognitive Psychology and/or Cognitive Modeling, the following courses should be selected as part of their Psychology Major in conjunction with their Psychology advisor's approval.

#### As part of the B.S. science requirement:

- 03-121 Modern Biology

#### As part of the psychology Breadth requirement:

- 85-211 Cognitive Psychology

#### As part of the psychology Research Methods requirement:

- 85-310 Research Methods in Cognitive Psychology

#### As part of the advanced coursework in psychology requirement, at least two of the following:

- 85-356 Music and Mind: The Cognitive Neuroscience of Sound
- 85-370 Perception
- 85-380 In Search of Mind: The History of Psychology
- 85-390 Human Memory
- 85-392 Human Expertise
- 85-395 Applications of Cognitive Science
- 85-406 Autism: Psychological and Neuroscience Perspectives
- 85-412 Cognitive Modeling
- 85-414 Cognitive Neuropsychology
- 85-419 Introduction to Parallel Distributed Processing
- 85-421 Language and Thought

85-426 Learning in Humans and Machines

85-429 Cognitive Brain Imaging

### Social-Personality Psychology Concentration

For Psychology majors who wish to have a focus of their study be on Social and/or Personality Psychology, the following courses should be selected as part of their Psychology Major in conjunction with their Psychology advisor's approval.

#### As part of the Psychology Breadth requirement:

85-241 Social Psychology

85-251 Personality

#### As part of the Psychology Research Methods requirement:

85-340 Research Methods in Social Psychology

#### As part of the advanced coursework in psychology requirement, at least two of the following:

85-352 Evolutionary Psychology

85-358 Pro-Social Behavior

85-375 Crosscultural Psychology

85-377 Attitudes and Persuasion

85-443 Social Factors and Well-Being

85-444 Relationships

85-446 Psychology of Gender

85-501 Stress, Coping and Well-Being

### Clinical/Counseling Psychology Concentration

For Psychology majors who wish to have a focus of their study be on Clinical/Counseling Psychology, the following courses should be selected as part of their Psychology Major in conjunction with their Psychology advisor's approval.

#### As part of the Psychology Breadth requirement at least one of the following:

85-241 Social Psychology

85-251 Personality

#### Required additional coursework:

85-261 Abnormal Psychology

85-281 Introduction to Clinical Psychology

85-480 Internship in Clinical Psychology

#### As part of the Psychology Research Methods requirements:

85-340 Research Methods in Social Psychology

#### As part of the advanced coursework in psychology requirement, at least two of the following:

85-375 Crosscultural Psychology

85-377 Attitudes and Persuasion

85-406 Autism: Psychological and Neuroscience Perspectives

85-414 Cognitive Neuropsychology

85-425 Child Psychopathology and Treatment

85-442 Health Psychology

85-443 Social Factors and Well-Being

85-444 Relationships

85-446 Psychology of Gender

85-481 Seminar in Intervention

85-501 Stress, Coping and Well-Being

## Neuroscience Major

The Psychology Department at Carnegie Mellon University has a major focus on the role of the brain and nervous system in cognition and behavior, including biological approaches involving the health impact that arises from the interaction of behavior with the nervous, endocrine, and immune systems. These interests are manifested in faculty research (<http://www.cmu.edu/dietrich/psychology/research-areas>), departmental and

university centers that operate from or heavily involve the department (e.g., the Center for Cognitive Brain Imaging (<http://www.ccbi.cmu.edu>), and the Center for the Neural Basis of Cognition (<http://www.cnbc.cmu.edu>)) as well as undergraduate coursework (<http://www.cmu.edu/dietrich/psychology/undergraduate>) and graduate coursework. For undergraduates, there are a number of ways in which students with an interest in these approaches can pursue that interest in an organized fashion. Major requirements can be found on the Neuroscience website (<http://www.cmu.edu/neuro/major>).

Carnegie Mellon University recently launched *BrainHub* – an initiative designed to leverage its core strengths in cognitive science, engineering, and computer science, and our emerging excellence in biological sciences, to harness the technology that helps the world explore brain and behavior.

Students will be able to take advantage of exciting opportunities such as lectures hosted on various topics, newly funded CMU campus research projects trying to answer pressing questions in brain science and the many global partnerships with other institutions all with the same motivating goal to enhance and increase research in brain sciences.

Finally, for any interested student, there is a minor in Cognitive Neuroscience available through the Psychology department (see below).

## Unified Double Major in Psychology & Biological Sciences

This major is intended to reflect the interdisciplinary nature of current research in the fields of biology and psychology, as well as the national trend in some professions to seek individuals broadly trained in both the social and natural sciences.

**Note:** Students entering from the Dietrich College of Humanities and Social Sciences will earn a Bachelor of Science in Psychology and Biological Sciences. Students in the Mellon College of Science will earn a Bachelor of Science in Biological Sciences and Psychology. Students in the joint Science and Humanities Scholars (SHS) program can complete the SHS educational core and choose either departmental order for their diploma.

Depending on a student's home college (DC or MCS), General Education (GenEd) requirements will be different. GenEd requirements for DC (<http://coursecatalog.web.cmu.edu/dietrichcollegeofhumanitiesandsocialsciences/#hampssgeneraleducationprogram160>) and MCS (<http://coursecatalog.web.cmu.edu/melloncollegeofscience>) are found on their respective Catalog pages.

### Degree Requirements:

Biological Sciences		Units
03-121	Modern Biology	9
or 03-151	Honors Modern Biology	
03-220	Genetics	9
03-231/232	Biochemistry I	9
03-320	Cell Biology	9
03-343	Experimental Techniques in Molecular Biology	12
03-411	Topics in Research	1
03-412	Topics in Research	1
03-xxx	General Biology Elective <sup>1</sup>	9
03-3xx	Advanced Biology Elective <sup>1</sup>	18
Total Biology units		77

<sup>1</sup> Please see description and requirements for electives under the B.S. in Biological Sciences section of this Catalog.

Mathematics, Statistics, Physics and Computer Science		Units
21-120	Differential and Integral Calculus	10
21-122	Integration and Approximation	10
or 21-124	Calculus II for Biologists and Chemists	
36-247	Statistics for Lab Sciences	9
or 36-201	Statistical Reasoning and Practice	
36-309	Experimental Design for Behavioral and Social Sciences	9
33-121	Physics I for Science Students <sup>MCS students must complete Physics II also (33-122)</sup>	12
15-110	Principles of Computing	10-12
or 15-112	Fundamentals of Programming and Computer Science	
or 02-201	Programming for Scientists	
99-10x	Computing at Carnegie Mellon	3
Total Science units		63-65

Chemistry	Units
09-105 Introduction to Modern Chemistry I	10
09-106 Modern Chemistry II	10
09-217 Organic Chemistry I	9
or 09-219 Modern Organic Chemistry	
09-218 Organic Chemistry II	9
or 09-220 Modern Organic Chemistry II	
09-207 Techniques in Quantitative Analysis	9-12
or 09-221 Laboratory I: Introduction to Chemical Analysis	
09-208 Techniques for Organic Synthesis and Analysis	9-12
or 09-222 Laboratory II: Organic Synthesis and Analysis	
<b>Total Chemistry units</b>	<b>56-62</b>

Psychology Courses	Units
85-102 Introduction to Psychology	9
85-219 Biological Foundations of Behavior	9
85-2xx Survey Psychology Courses*	18
85-310 Research Methods in Cognitive Psychology	9
or 85-340 Research Methods in Social Psychology	
or 85-320 Research Methods in Developmental Psychology	
or 85-314 Cognitive Neuroscience Research Methods	
or 85-330 Analytic Research Methods	
85-3xx Advanced Psychology Electives	18
<b>Total Psychology units</b>	<b>63</b>

\* Excluding 85-261 Abnormal Psychology

#### Additional Advanced Elective

##### 9 units(Choose one of the following courses)

85-3xx Advanced Psychology Elective	9
or	
03-3xx Advanced Biology Elective	9

#### Additional Laboratory or Research Methods

##### 9-12 units(Choose one of the following courses)

03-344 Experimental Biochemistry	12
03-345 Experimental Cell and Developmental Biology	12
85-310 Research Methods in Cognitive Psychology	9
85-314 Cognitive Neuroscience Research Methods	9
85-320 Research Methods in Developmental Psychology	9
85-340 Research Methods in Social Psychology	9

Elective Units	Units
Free Electives	33-36
MCS Nontechnical Breadth or DC General Education requirements	36-48
<b>Total Elective units</b>	<b>69-84</b>

### 360

#### Minimum number of units required for degree:

## The Major in Cognitive Science

The Psychology Department offers a B.S. degree in Cognitive Science. The field of cognitive science has grown out of increasingly active interaction among psychology, linguistics, artificial intelligence, philosophy, and neuroscience. All of these fields share the goal of understanding intelligence. By combining these diverse perspectives, students of cognitive science are able to understand cognition at a deep level. Because this major is administered by the Psychology Department, it focuses on human cognition and the experimental study of the human mind as illuminated by the techniques of the above disciplines.

## Cognitive Science Curriculum

The Cognitive Science major is only offered as a B.S. degree. Candidates should complete before the junior year the two-semester calculus sequence 21-120 /21-256 (or alternatively 21-120/21-122)\* and a statistics sequence (36-201 or equivalent and if possible, 36-309 ). In addition, candidates complete 15-112 Fundamentals of Programming and Computer Science, as their departmental computing course.

Because of the number and sequential nature of required courses, prospective Cognitive Science majors are encouraged to begin course work for the major prior to junior year. In particular, completion of calculus, 36-201, and 85-211 or 85-213 before the junior year will enable students to complete 85-310 and 36-309 and by the Fall semester of their sophomore or junior year and, if interested, to then take advantage of research opportunities in the department.

\*The 3-Semester sequence 21-111 /21-112/21-256 may be substituted by students who have already taken 21-111 before deciding on the major.

Computing Prerequisite	10 units
15-112 Fundamentals of Programming and Computer Science	12

Mathematics	29-30 units
21-120-21-122 Differential and Integral Calculus - Integration and Approximation	20

or

21-120-21-256 Differential and Integral Calculus - Multivariate Analysis*	19
21-127 Concepts of Mathematics	10

\*Students who place out of 21-120 are only required to successfully complete 21-122 or 21-256 instead of the full two-semester sequence.

Statistics Sequence	18 units
36-201 Statistical Reasoning and Practice	9
36-309 Experimental Design for Behavioral and Social Sciences	9

Computational/Cognitive Modeling Core	29-31 units
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Two of the following:	Units
15-122 Principles of Imperative Computation	10
15-150 Principles of Functional Programming	10
15-251 Great Theoretical Ideas in Computer Science	12

Plus one of the following:	Units
85-412 Cognitive Modeling	9
85-419 Introduction to Parallel Distributed Processing	9
85-426 Learning in Humans and Machines	9

Cognitive Psychology Core	27 units
85-211 Cognitive Psychology	9
or 85-213 Human Information Processing and Artificial Intelligence	
85-310 Research Methods in Cognitive Psychology	9

Plus two of the following (one of which must be 85-3xx or 85-4xx):	Units
85-219 Biological Foundations of Behavior	9
85-370 Perception	9
85-390 Human Memory	9
85-395 Applications of Cognitive Science	9
85-408 Visual Cognition	9
85-414 Cognitive Neuropsychology	9
80-381 Meaning in Language	9
80-310 Formal Logic	9
80-314 Logic and Artificial Intelligence	9
80-315 Modal Logic	9
80-316 Causation Probability & AI	9
80-383 Language in Use	9

## Cognitive Science Concentration

(3 courses, concentration approval required)

These three courses are chosen in conjunction with your advisor to form a coherent area of concentration from the course list under "Cognitive Science Concentration" in the current Undergraduate Catalog. Before proceeding with the choice of courses, students must fill out the concentration form, obtained from Emilie O'Leary in Baker Hall 339, with a description of the concentration area and the planned set of three courses. Courses not



represented on the list may, with pre-approval of advisor and department, be used to satisfy part of this requirement. The three courses are not required to be within any single category below but be coherent within the major and the focus may vary across disciplinary boundaries. Courses taken for the major requirements can not be double counted in the concentration.

<b>Computer Science</b>		<b>36 units</b>
15-385	Introduction to Computer Vision	6
15-453	Formal Languages, Automata, and Computability	9
10-601	Introduction to Machine Learning (Masters)	12
05-410	User-Centered Research and Evaluation	12
05-432	Personalized Online Learning	12

<b>Psychology</b>		
85-219	Biological Foundations of Behavior	9
85-352	Evolutionary Psychology	9
85-354	Infant Language Development	9
85-370	Perception	9
85-375	Crosscultural Psychology	9
85-380	In Search of Mind: The History of Psychology	9
85-390	Human Memory	9
85-392	Human Expertise	9
85-395	Applications of Cognitive Science	9
85-406	Autism: Psychological and Neuroscience Perspectives	9
85-412	Cognitive Modeling	9
85-414	Cognitive Neuropsychology	9
85-419	Introduction to Parallel Distributed Processing	9
85-421	Language and Thought	9
85-423	Cognitive Development	9
85-426	Learning in Humans and Machines	9
85-429	Cognitive Brain Imaging	9

<b>Philosophy</b>		
80-210	Logic and Proofs	9
80-211	Logic and Mathematical Inquiry	9
80-220	Philosophy of Science	9
80-254	Analytic Philosophy	9
80-255	Pragmatism	9
80-270	Philosophy of Mind	9
80-310	Formal Logic	9
80-311	Undecidability and Incompleteness	9
80-314	Logic and Artificial Intelligence	9

<b>Linguistics</b>		
76-385	Introduction to Discourse Analysis	9
80-280	Linguistic Analysis	9

<b>Decision Sciences</b>		
88-302	Behavioral Decision Making	9

<b>Neurosciences</b>		
03-362	Cellular Neuroscience	9
03-363	Systems Neuroscience	9
42-202	Physiology	9
15-386	Neural Computation	9
15-883	Computational Models of Neural Systems	12

#### Science Requirement 18 units (minimum)

The Cognitive Science program requires two additional science courses (in the same science) beyond the college's two-course Science Education General Requirement.

These can be selected from any one of the following areas.

03-xxx	Biology*
09-xxx	Chemistry
33-xxx	Physics

\* Those interested in a cognitive neuroscience focus are recommended to take biology courses, including if possible, 03-362, or 03-363.

## Additional Major in Cognitive Science

In order to complete a double major in Cognitive Science, a student must fulfill the major requirements as listed under the Cognitive Science major. These include the programming requirement (15-112), the Mathematics and Statistics prerequisites, Computational/Cognitive Modeling Core, The Cognitive Psychology Core, the Cognitive Science Concentration Requirement, and the Supplementary Science Requirement. Students will be assigned a department advisor to help plan their program of studies in Cognitive Science.

## Minors in Psychology and Cognitive Neuroscience

### 72 units Minor in Psychology

#### I. Introductory course

85-102	Introduction to Psychology*	9
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\*A survey course can be taken in place of 85-102.

#### II. Area Survey courses

Complete two courses.

85-211	Cognitive Psychology	9
or 85-213	Human Information Processing and Artificial Intelligence	
85-219	Biological Foundations of Behavior	9
85-221	Principles of Child Development	9
85-241	Social Psychology	9
85-251	Personality	9

#### III. Statistics

36-201	Statistical Reasoning and Practice	9
36-309	Experimental Design for Behavioral and Social Sciences	9

### 27 units Upper Level Courses

Complete three courses from categories IV and V, with at least one course from each.

#### IV. Research Methods Courses\* (minimum 9 units)

85-310	Research Methods in Cognitive Psychology	9
85-314	Cognitive Neuroscience Research Methods	9
85-320	Research Methods in Developmental Psychology	9
85-330	Analytic Research Methods	9
85-340	Research Methods in Social Psychology	9

\* Prerequisites for all Research Methods courses: 36-309 and the appropriate survey course.

#### V. Advanced courses (minimum 9 units)

Advanced psychology courses exist within four areas (cognitive, cognitive neuroscience, developmental, social and health psychology.) Any advanced content course or seminar in psychology or any psychology course higher than 85-350. Exceptions for the advanced course requirement are: 85-480, 85-482, 85-484, 85-484, 85-506, 85-507, 85-508, 85-601, 85-602, 66-501, 66-502.

### Minor in Cognitive Neuroscience 63 units

The minor in Cognitive Neuroscience offered by the Department of Psychology is similar to the Neuroscience Minor offered by the Department of Biological Sciences. The differences between the two forms of the minor are determined by one required course, and additionally, by the students' choice of distribution electives. The requirements for the Cognitive Neuroscience Minor include 7 courses: four required courses, and three distribution and elective courses.

Because of the curriculum within this minor may overlap with some degree requirements, no more than 2 courses fulfilling Neuroscience or Cognitive Neuroscience Minor requirements may count towards a student's major or other minor requirements.

## Cognitive Neuroscience Curriculum

### Required Coursework

03-121	Modern Biology	9
03-363	Systems Neuroscience	9
85-219	Biological Foundations of Behavior	9
85-211	Cognitive Psychology	9
or 85-213	Human Information Processing and Artificial Intelligence	

### Distribution Requirements

#### Three courses, including at least 1 from each of the following categories

##### Approaches to Cognitive Neuroscience

85-314	Cognitive Neuroscience Research Methods	9
85-412	Cognitive Modeling	9
85-414	Cognitive Neuropsychology	9
85-419	Introduction to Parallel Distributed Processing	9
85-429	Cognitive Brain Imaging	9
15-386	Neural Computation	9
15-883	Computational Models of Neural Systems	12
36-746	Statistical Methods for Neuroscience and Psychology	12

##### Cognitive Neuroscience Electives

03-362	Cellular Neuroscience	9
03-364	Developmental Neuroscience	9
03-365	Neural Correlates of Learning and Memory	9
85-356	Music and Mind: The Cognitive Neuroscience of Sound	9
85-370	Perception	9
85-385	Auditory Perception: Sense of Sound	9
85-390	Human Memory	9
85-406	Autism: Psychological and Neuroscience Perspectives	9

VICKI S. HELGESON, Professor of Psychology – Ph.D., University of Denver; Carnegie Mellon, 1990–.

LAURIE HELLER, Associate Teaching Professor – Ph.D., University of Pennsylvania; Carnegie Mellon, 2009–.

LORI L. HOLT, Associate Professor – Ph.D., University of Wisconsin; Carnegie Mellon, 1999–.

MARCEL A. JUST, D. O. Hebb Professor of Psychology – Ph.D., Stanford University; Carnegie Mellon, 1972–.

CHARLES KEMP, Associate Professor – Ph.D., Massachusetts Institute of Technology; Carnegie Mellon, 2008–.

DAVID KLAHR, Walter van Dyke Bingham Professor – Ph.D., Carnegie Mellon University; Carnegie Mellon, 1969–.

ROBERTA KLATZKY, Professor of Psychology – Ph.D., Stanford University; Carnegie Mellon, 1993–.

KENNETH R. KOEDINGER, Professor of HCI – Ph.D., Carnegie Mellon University; Carnegie Mellon, 2001–.

KENNETH KOTOVSKY, Professor of Psychology, Director, Undergraduate Studies in Psychology – Ph.D., Carnegie Mellon University; Carnegie Mellon, 1988–.

MARSHA C. LOVETT, Teaching Professor – Ph.D., Carnegie Mellon University; Carnegie Mellon, 2000–.

BRIAN MACWHINNEY, Professor of Psychology – Ph.D., University of California, Berkeley; Carnegie Mellon, 1981–.

DAVID PLAUT, Professor of Psychology – Ph.D., Carnegie Mellon University; Carnegie Mellon, 1994–.

DAVID RAKISON, Associate Professor – D.Phil., University of Sussex; Carnegie Mellon, 2000–.

LYNNE M. REDER, Professor of Psychology – Ph.D., University of Michigan; Carnegie Mellon, 1978–.

MICHAEL F. SCHEIER, Professor of Psychology, Head, Psychology Department – Ph.D., University of Texas; Carnegie Mellon, 1975–.

ROBERT S. SIEGLER, Theresa Heinz Professor of Psychology – Ph.D., State University of New York, Stony Brook; Carnegie Mellon, 1974–.

JAMES J. STASZEWSKI, Research Professor – Ph.D., Cornell University; Carnegie Mellon, 1995–.

MICHAEL TARR, Professor of Psychology – Ph.D., Massachusetts Institute of Technology; Carnegie Mellon, 2009–.

ERIK D. THIESSEN, Associate Professor – Ph.D., University of Wisconsin, Madison; Carnegie Mellon, 2004–.

TIMOTHY VERSTYNEN, Assistant Professor – Ph.D., University of California, Berkeley; Carnegie Mellon, 2006–.

## The Honors Program

The Honors Program provides recognition of outstanding performance by students in the Psychology department. Participation enables students to pursue their own research ideas through completion of an honors thesis. The honors thesis is completed during the senior year. By completing a thesis, the student earns 18 units of credit and qualifies for graduation with “College Honors.” To qualify for the Honors Program, the student must maintain a quality point average of at least 3.50 in the major and 3.25 overall. More information on the Honor program can be found here (<http://www.cmu.edu/dietrich/undergraduate/programs/shp>).

A year long departmental senior thesis course exists (66-501 and 66-502) for students interested in pursuing a sizable research project who do not qualify for the honors program. More information can be obtained by contacting Emillie O’Leary at [emillie@andrew.cmu.edu](mailto:emillie@andrew.cmu.edu).

## Faculty

JOHN R. ANDERSON, Richard King Mellon University Professor of Psychology and Computer Science – Ph.D., Stanford University; Carnegie Mellon, 1978–.

MARLENE BEHRMANN, Professor of Psychology – Ph.D., University of Toronto; Carnegie Mellon, 1993–.

SHARON CARVER, Director of Children’s School, Teaching Professor of Psychology – Ph.D., Carnegie Mellon University; Carnegie Mellon, 1993–.

SHELDON COHEN, Robert E. Doherty Professor of Psychology – Ph.D., New York University; Carnegie Mellon, 1982–.

CHANTE COX-BOYD, Associate Teaching Professor – Ph.D., University of North Carolina at Chapel Hill; Carnegie Mellon, 2001–.

DAVID CRESWELL, Associate Professor – Ph.D., University of California, Los Angeles; Carnegie Mellon, 2008–.

KASEY CRESWELL, Assistant Professor – Ph.D., University of Pittsburgh; Carnegie Mellon, 2012–.

BROOKE C. FEENEY, Professor of Psychology – Ph.D., State University of New York at Buffalo; Carnegie Mellon, 2001–.

ANNA FISHER, Associate Professor – Ph.D., The Ohio State University; Carnegie Mellon, 2006–.

JOHN R. HAYES, Emeritus Professor of Psychology – Ph.D., Massachusetts Institute of Technology; Carnegie Mellon, 1965–.