Department of Psychology

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http://www.cmu.edu/dietrich/psychology/index.html

Can new born 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 project 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 and CMU Children’s School (http://www.cmu.edu/dietrich/psychology/centers-and-facilities).

Psychology Curriculum

Mathematics 19-20 units
21-111-21-112 Differential Calculus - Integral Calculus 20
or
21-120-21-122 Differential and Integral Calculus - Integration and Approximation 20
or
21-210-21-256 Differential and Integral Calculus - Multivariate Analysis 19

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

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

Breadth Requirement 36 units
85-102 Introduction to Psychology 9
Survey Courses - Complete Three
85-211 Cognitive Psychology 9
or 85-213 Human Information Processing and Artificial Intelligence 9
85-219 Biological Foundations of Behavior 9
85-221 Principles of Child Development 9
85-241 Social Psychology 9
85-251 Personality 9

* A fourth survey course can be taken in place of Introduction to Psychology

Research Methods* 18 units
Complete two courses.
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 or equivalent, and corresponding survey course.

Advanced Courses 18 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, 85-506, 85-507, 85-508, 85-601, 85-602, 66-501, 66-502.

Computer Science Requirement 10 units
15-110 Principles of Computing 10
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 (*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.*)
- 09-XXX Chemistry
- 33-XXX Physics

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 GenEd requirement.

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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>03-121</td>
<td>Modern Biology</td>
<td>9</td>
</tr>
<tr>
<td>85-219</td>
<td>Biological Foundations of Behavior</td>
<td>9</td>
</tr>
<tr>
<td>85-241</td>
<td>Social Psychology</td>
<td>9</td>
</tr>
</tbody>
</table>

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
- 85-375 Crosscultural Psychology
- 85-406 Autism: Psychological and Neuroscience Perspectives
- 85-418 Contributions of Psychological Research to Education
- 85-421 Cognitive Development
- 85-419 Introduction to Parallel Distributed Processing
- 85-429 Cognitive Brain Imaging

Cognitive Psychology Concentration

For Psychology majors who wish to have a focus of their study 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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>03-121</td>
<td>Modern Biology</td>
<td>9</td>
</tr>
<tr>
<td>03-363</td>
<td>Systems Neuroscience</td>
<td>9</td>
</tr>
<tr>
<td>85-211</td>
<td>Cognitive Psychology</td>
<td>9</td>
</tr>
<tr>
<td>85-219</td>
<td>Biological Foundations of Behavior</td>
<td>9</td>
</tr>
</tbody>
</table>

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
- 85-429 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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>03-121</td>
<td>Modern Biology</td>
<td>9</td>
</tr>
<tr>
<td>85-221</td>
<td>Principles of Child Development</td>
<td>9</td>
</tr>
<tr>
<td>85-320</td>
<td>Research Methods in Developmental Psychology</td>
<td>9</td>
</tr>
</tbody>
</table>

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
- 85-375 Crosscultural Psychology
- 85-406 Autism: Psychological and Neuroscience Perspectives
- 85-418 Contributions of Psychological Research to Education
- 85-421 Cognitive Development
- 85-425 Child Psychopathology and Treatment

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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>03-121</td>
<td>Modern Biology</td>
<td>9</td>
</tr>
<tr>
<td>03-363</td>
<td>Systems Neuroscience</td>
<td>9</td>
</tr>
<tr>
<td>85-355</td>
<td>Introduction to Parallel Distributed Processing</td>
<td>9</td>
</tr>
<tr>
<td>85-375</td>
<td>Applications of Cognitive Science</td>
<td>9</td>
</tr>
<tr>
<td>85-406</td>
<td>Autism: Psychological and Neuroscience Perspectives</td>
<td>9</td>
</tr>
</tbody>
</table>

* 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.*
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>85-419</td>
<td>Introduction to Parallel Distributed Processing</td>
<td>9</td>
</tr>
<tr>
<td>85-421</td>
<td>Language and Thought</td>
<td>9</td>
</tr>
<tr>
<td>85-426</td>
<td>Learning in Humans and Machines</td>
<td>9</td>
</tr>
<tr>
<td>85-429</td>
<td>Cognitive Brain Imaging</td>
<td>9</td>
</tr>
</tbody>
</table>

**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 9 units  
- **85-251** Personality 9 units

As part of the Psychology Research Methods requirement:  
- **85-340** Research Methods in Social Psychology 9 units

As part of the advanced coursework in psychology requirement, at least two of the following:  
- **85-352** Evolutionary Psychology 9 units  
- **85-358** Pro-Social Behavior 9 units  
- **85-375** Crosscultural Psychology 9 units  
- **85-377** Attitudes and Persuasion 9 units  
- **85-443** Social Factors and Well-Being 9 units  
- **85-444** Relationships 9 units  
- **85-446** Psychology of Gender 9 units  
- **85-501** Stress, Coping and Well-Being 9 units

**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 9 units  
- **85-251** Personality 9 units

Required additional coursework:  
- **85-261** Abnormal Psychology 9 units  
- **85-281** Introduction to Clinical Psychology 9 units  
- **85-480** Internship in Clinical Psychology Var. units

As part of the Psychology Research Methods requirements:  
- **85-340** Research Methods in Social Psychology 9 units

As part of the advanced coursework in psychology requirement, at least two of the following:  
- **85-375** Crosscultural Psychology 9 units  
- **85-377** Attitudes and Persuasion 9 units  
- **85-406** Autism: Psychological and Neuroscience Perspectives 9 units  
- **85-414** Cognitive Neuropsychology 9 units  
- **85-425** Child Psychopathology and Treatment 9 units  
- **85-442** Health Psychology 9 units  
- **85-443** Social Factors and Well-Being 9 units  
- **85-444** Relationships 9 units  
- **85-446** Psychology of Gender 9 units  
- **85-501** Stress, Coping and Well-Being 9 units

**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.cmich.edu/dietchrom/pyschol/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.

**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**  
- **15-112** Fundamentals of Programming and Computer Science 10 units

**Mathematics**  
- **21-120-21-122** Differential and Integral Calculus - Integration and Approximation 20 units
  - or  
- **21-120-21-256** Differential and Integral Calculus - Multivariate Analysis 19 units
- **21-127** Concepts of Mathematics 10 units

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

**Computational/Cognitive Modeling Core**  
- **29-31 units**
  - Two of the following:  
    - **15-122** Principles of Imperative Computation 10 units
    - **15-150** Principles of Functional Programming 10 units
    - **15-251** Great Ideas in Theoretical Computer Science 12 units
Computer Science 36 units taken for the major requirements can not be double counted in the major and the focus may vary across disciplinary boundaries. Courses required to be within any single category below but be coherent within concentration area and the planned set of three courses. The three courses are 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 chosen in conjunction with your advisor to form a concentration. (3 courses, concentration approval required)

**Cognitive Science Concentration**

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.

**Computer Science**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>16-385 Computer Vision</td>
<td>9</td>
</tr>
<tr>
<td>15-453 Formal Languages, Automata, and Computability</td>
<td>9</td>
</tr>
<tr>
<td>10-601 Introduction to Machine Learning (Master’s)</td>
<td>12</td>
</tr>
<tr>
<td>05-410 User-Centered Research and Evaluation</td>
<td>12</td>
</tr>
<tr>
<td>05-432 Personalized Online Learning</td>
<td>12</td>
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</tbody>
</table>

**Psychology**

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

**Philosophy**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>80-210 Logic and Proofs</td>
<td>9</td>
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<tr>
<td>80-211 Logic and Mathematical Inquiry</td>
<td>9</td>
</tr>
<tr>
<td>80-220 Philosophy of Science</td>
<td>9</td>
</tr>
<tr>
<td>80-254 Analytic Philosophy</td>
<td>9</td>
</tr>
<tr>
<td>80-255 Pragmatism</td>
<td>9</td>
</tr>
<tr>
<td>80-270 Philosophy of Mind</td>
<td>9</td>
</tr>
<tr>
<td>80-310 Formal Logic</td>
<td>9</td>
</tr>
<tr>
<td>80-311 Undecidability and Incompleteness</td>
<td>9</td>
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<tr>
<td>80-314 Logic and Artificial Intelligence</td>
<td>9</td>
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</tbody>
</table>

**Linguistics**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>76-385 Introduction to Discourse Analysis</td>
<td>9</td>
</tr>
<tr>
<td>80-280 Linguistic Analysis</td>
<td>9</td>
</tr>
</tbody>
</table>

**Decision Sciences**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>88-302 Behavioral Decision Making</td>
<td>9</td>
</tr>
</tbody>
</table>

**Neurosciences**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>03-362 Cellular Neuroscience</td>
<td>9</td>
</tr>
<tr>
<td>03-363 Systems Neuroscience</td>
<td>9</td>
</tr>
<tr>
<td>42-202 Physiology</td>
<td>9</td>
</tr>
<tr>
<td>15-386 Neural Computation</td>
<td>9</td>
</tr>
<tr>
<td>15-883 Computational Models of Neural Systems</td>
<td>12</td>
</tr>
</tbody>
</table>

**Science Requirement**

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

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>03-xxx Biology</td>
<td></td>
</tr>
<tr>
<td>09-xxx Chemistry</td>
<td></td>
</tr>
<tr>
<td>33-xxx Physics</td>
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</tr>
</tbody>
</table>

* 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.

**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://coursescatalog.web.cmu.edu/dietrichcollegeofhumanitiesandsocialsciences/#hampssgeneraleducationprogram160) and MCS (http://coursescatalog.web.cmu.edu/melloncollegeofscience) are found on their respective Catalog pages.

**Degree Requirements:**

<table>
<thead>
<tr>
<th>Biological Sciences</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
### Additional Laboratory or Research Methods
- 03-320 Cell Biology
- 03-343 Experimental Techniques in Molecular Biology
- 03-411 Topics in Research
- 03-412 Topics in Research
- 03-xxx General Biology Elective
- 03-3xx Advanced Biology Elective

### Total Biology units
77

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

### Mathematics, Statistics, Physics and Computer Science
<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-120 Differential and Integral Calculus</td>
<td>10</td>
</tr>
<tr>
<td>or 21-124 Calculus II for Biologists and Chemists</td>
<td>10</td>
</tr>
<tr>
<td>36-247 Statistics for Lab Sciences</td>
<td>9</td>
</tr>
<tr>
<td>or 36-201 Statistical Reasoning and Practice</td>
<td>9</td>
</tr>
<tr>
<td>36-309 Experimental Design for Behavioral and Social Sciences</td>
<td>9</td>
</tr>
<tr>
<td>33-121 Physics I for Science Students</td>
<td>12</td>
</tr>
<tr>
<td>or 15-110 Principles of Computing</td>
<td>10-12</td>
</tr>
<tr>
<td>or 15-112 Fundamentals of Programming and Computer Science</td>
<td></td>
</tr>
<tr>
<td>99-10x Computing at Carnegie Mellon</td>
<td>3</td>
</tr>
</tbody>
</table>

### Total Science units
63-65

1 MCS students must also complete 33-122 Physics II for Biological Sciences & Chemistry Students.

### Chemistry
<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>09-105 Introduction to Modern Chemistry I</td>
<td>10</td>
</tr>
<tr>
<td>09-106 Modern Chemistry II</td>
<td>10</td>
</tr>
<tr>
<td>09-217 Organic Chemistry I</td>
<td>9</td>
</tr>
<tr>
<td>or 09-219 Modern Organic Chemistry</td>
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</tr>
<tr>
<td>09-218 Organic Chemistry II</td>
<td>9</td>
</tr>
<tr>
<td>or 09-220 Modern Organic Chemistry II</td>
<td></td>
</tr>
<tr>
<td>09-207 Techniques in Quantitative Analysis</td>
<td>9-12</td>
</tr>
<tr>
<td>or 09-221 Laboratory I: Introduction to Chemical Analysis</td>
<td></td>
</tr>
<tr>
<td>09-208 Techniques for Organic Synthesis and Analysis</td>
<td>9-12</td>
</tr>
<tr>
<td>or 09-222 Laboratory II: Organic Synthesis and Analysis</td>
<td></td>
</tr>
</tbody>
</table>

### Total Chemistry units
56-62

### Psychology Courses
<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>85-102 Introduction to Psychology</td>
<td>9</td>
</tr>
<tr>
<td>85-219 Biological Foundations of Behavior</td>
<td>9</td>
</tr>
<tr>
<td>85-2xx Survey Psychology Courses *</td>
<td>18</td>
</tr>
<tr>
<td>85-310 Research Methods in Cognitive Psychology</td>
<td>9</td>
</tr>
<tr>
<td>or 85-340 Research Methods in Social Psychology</td>
<td></td>
</tr>
<tr>
<td>or 85-320 Research Methods in Developmental Psychology</td>
<td></td>
</tr>
<tr>
<td>or 85-314 Cognitive Neuroscience Research Methods</td>
<td></td>
</tr>
<tr>
<td>or 85-330 Analytic Research Methods</td>
<td></td>
</tr>
<tr>
<td>85-3xx Advanced Psychology Electives</td>
<td>18</td>
</tr>
</tbody>
</table>

### Total Psychology units
63

1 Excluding 85-261 Abnormal Psychology

### Additional Advanced Elective 9 units
(Choose one of the following courses)
- 85-3xx Advanced Psychology Elective
- 03-3xx Advanced Biology Elective

### Additional Laboratory or Research Methods 9-12 units
(Choose one of the following courses)
- 03-344 Experimental Biochemistry
- 03-345 Experimental Cell and Developmental Biology

### Elective Units
<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCS Nontechnical Breadth or DC General Education requirements</td>
<td>36-48</td>
</tr>
</tbody>
</table>

### Total Elective units
69-84

### Minimum number of units required for degree: 360

### Minors in Psychology and Cognitive Neuroscience

#### Minor in Psychology
72 units

I. Introductory course
- 85-102 Introduction to Psychology * 9

II. Area Survey courses
Complete two courses.
- 85-211 Cognitive Psychology
- or 85-213 Human Information Processing and Artificial Intelligence
- 85-219 Biological Foundations of Behavior
- 85-221 Principles of Child Development
- 85-241 Social Psychology
- 85-251 Personality

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

IV. Research Methods Courses * (minimum 9 units)
- 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

V. Advanced courses (minimum 9 units)

#### 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.
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 a major in Psychology. More information on the honors program can be found at 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 Emilie O’Leary at emilier@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. Doeherty University 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, 1999–.

DAVID CRESWELL, Associate Professor – Ph.D., University of California, Los Angeles; Carnegie Mellon, 2009–.

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–.

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, Professor of Psychology – Ph.D., University of Wisconsin; Carnegie Mellon, 1999–.

MARCEL A. JUST, D. O. Hebb University 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, Charles J. Queenan Jr., Professor of Psychology – Ph.D., Stanford University; Carnegie Mellon, 1993–.

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

KENNETH KOTOVSKY, Emeritus Professor of Psychology, Director, Undergraduate Studies in Psychology – Ph.D., Carnegie Mellon University; Carnegie Mellon, 1968–.

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–.

KODY MANKE, Visiting Assistant Teaching Professor – Ph.D. Standford University; Carnegie Mellon, 2016–.

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 – 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–.

MICHAEL TARR, Professor of Psychology, Head, Department 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 VERSTYNE, Associate Professor – Ph.D., University of California, Berkeley; Carnegie Mellon, 2006–.

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

03-133 Neurobiology of Disease 9
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

Distribution Requirements

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

Distribution 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 9

Carnegie Mellon, 2012–.

KASEY CRESWELL, Assistant Professor – Ph.D., University of Pittsburgh; Angeles; Carnegie Mellon, 2008–.

DAVID CRESWELL, Associate Professor – Ph.D., University of California, North Carolina at Chapel Hill; Carnegie Mellon, 1999–.

CHANTE COX-BOYD, Associate Teaching Professor – Ph.D., New York University; Carnegie Mellon, 1982–.

SHELDON COHEN, Robert E. Doherty University Professor of Psychology – Ph.D., Carnegie Mellon University; Carnegie Mellon, 1993–.

Martha L. Cooper, Assistant Professor – Ph.D., University of South Carolina; Carnegie Mellon, 2016–.

TIMOTHY ERDELYI, Associate Professor – Ph.D., Stanford University; Carnegie Mellon, 2000–.

Erik D. Thiessen, Associate Professor – Ph.D., University of Wisconsin, Madison; Carnegie Mellon, 2004–.

John R. Verstynen, Associate Professor – Ph.D., University of California, Berkeley; Carnegie Mellon, 2006–.