Synopsis. BCS offers a year-long research course for undergraduate BCS majors. The goal of the 1st semester (BCS206) is for students to gain experience with research methods in cognitive science by performing a project that involves replicating an important finding in the field. The goal of the 2nd semester (BCS207) is to perform a more substantial original research project that builds upon the first semester project to address a novel research question. The course will consist of a combination of weekly class-based meetings and group-based reading and research under the supervision of the course instructors, with the help of a faculty mentor for each research group.

Students will work collaboratively in small groups, and will gain extensive hands-on experience with critical analysis of scientific literature, experimental design, programming of stimuli and behavioral tasks, data collection, statistical analysis, oral presentation, and writing of research manuscripts. The end-goal of the course is for each group to produce a research manuscript that may be of sufficient quality to be submitted for publication.

Prerequisites and Requirements. The following are requirements for students to be able to enroll in the BCS206/207 course sequence:

- The course is open to rising juniors who are declared BCS majors (or planning to declare soon), as well as rising sophomores who fully intend to declare a BCS major. The course is not open to NSC majors or other majors at this time.
- Students must commit to enrolling in BCS206 in Fall 2016 and BCS207 in Spring 2017. It is not possible to take just one of the two courses, nor is it possible to take them out of sequence.
- Enrollment will be capped at 20 students who will be allowed to register with permission of the instructor. Interested students must complete the attached application form.
- Considerable facility with computer programming is required. Students must have completed at least one semester of a computer programming course, or have equivalent experience that can be documented. Experience with Matlab, Python, or R is desirable but experience with other programming languages is also acceptable.
- Students should have taken at least 2 of the following 5 courses prior to enrolling: BCS110, BCS111, BCS151, BCS152, BCS153.
- Students should have taken a statistics course (e.g., STT212) or will need to take it concurrently with BCS206 in the first semester of this sequence.

Other considerations.

- Students who are selected to enroll in BCS206 will be relieved from one BCS laboratory requirement (e.g., BCS204, BCS205, or BCS208). In addition, BCS207 will satisfy one open-elective or one track-elective. Thus, taking this course sequence should not extend time-to-degree.
- BCS 206/207 can be used to substitute certain other requirements for the BCS major/minor. In case of doubt check with your advisor or the undergraduate program coordinator, Melinda Adelman.
- Students will work collaboratively in a small group throughout the course of the two semesters. Interested students should be comfortable with working on group projects and should strongly value teamwork.
- We expect that the course will be offered on MW 9-10:15 AM in both semesters, but please check the registrar web site for any possible changes. Students should plan accordingly for Spring 2017.
Example projects conducted in year 2015-2016.

- Visual psychophysics study on the role of certainty and confidence in visual perception
- Internet-based investigation of speech perception/adaptation study
- Eye-tracking experiment on online language comprehension

Last year, students presented their research projects at

- University of Rochester undergraduate research fair
- National conference for undergraduate research
- International conferences

Course overview

<table>
<thead>
<tr>
<th>Introduction</th>
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<tr>
<td>In classes, course instructors and guest instructors provide lectures on topics and research methods in Cognitive Science throughout the semester</td>
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<tr>
<th>Group project</th>
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<tr>
<td>Students choose among topics offered by BCS faculty members</td>
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<tr>
<td>Weekly meetings with faculty members (in addition to weekly class meetings) to carry out replication study</td>
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<td>Stimuli design</td>
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<td>Subject testing</td>
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<td>Data analysis</td>
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<td>Fall semester final presentation and write-up in paper form</td>
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<th>BCS 206 (Fall 2016)</th>
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<tr>
<td>In classes, students learn about statistical analyses on their own data, making scientific figures, writing a research paper, and preparing a poster presentation.</td>
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<th>Group project</th>
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<tr>
<td>Students will form an original hypothesis building on the result obtained in the replication project in BCS 206</td>
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<tr>
<td>Weekly meetings with faculty members (in addition to weekly class meetings)</td>
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<tr>
<td>Stimuli design, Subject testing, Data analysis</td>
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<tr>
<td>Poster presentation at UR undergraduate research fair</td>
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<td>Scientific paper summarizing original results to be submitted to journal</td>
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Application Form
BCS Research Course, BCS206/207

Name: ____________________________________________________________

Email address: __________________________________________________________________________

Current Year (Freshman, Sophomore, etc): _________________________________________________

Check one of the following:
____ I am a sophomore and have already declared as a BCS major
____ I am a freshman or sophomore and I intend to declare as a BCS major

I understand that enrolling in BCS206 in Fall 2016 implies that I am fully committed to enroll in BCS207 in
Spring 2017:

Signature: ____________________________________________________________________________

Current GPA: __________

Course Prerequisites: place a check mark next to the courses that you have taken or are currently taking
____ BCS110    ____ BCS111    ____ BCS151    ____ BCS152    ____ BCS153

Please list the statistics course(s) that you have taken or plan to take concurrently with BCS 206:
_____________________________________________________________________________________

Please describe your computer programming experience, including programming courses that you have taken:
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

On a separate sheet of paper, please write a short description that includes:
• Reasons why you are interested in taking the BCS research course sequence
• Previous or current research experiences you have had, including the names of any faculty members
  with whom you have worked, at UR or elsewhere (previous research experience is not a requirement)

Applications should include an unof ficial transcript of courses taken and grades.

Please submit your application materials and/or any questions to co-instructors Ralf Haefner
(rhaefne2@ur.rochester.edu) or Chigusa Kurumada (ckurumada@bcs.rochester.edu) with subject line
“BCS206 application” and “BCS206 question”, respectively, by Monday April 11th. Permission codes for registration will be provided after review of applications.