NEW UNDERGRADUATE PROGRAM PROPOSAL

ILLINOIS INSTITUTE OF TECHNOLOGY

*The following information is required by the Undergraduate Studies Committee to approve new programs. After approval by UGSC this form should be routed to Faculty Council for approval and then the Provost’s office.*

**College(s)**: College of Science and Lewis College of Human Sciences

**Department(s):** Biological Sciences and Psychology

**Date:** September 29, 2015

**Approvals Required**

1. **Academic Unit Head(s)**:
2. **Dean(s):**

**(3) Undergraduate Studies Chair:**

# GENERAL INFORMATION

**Program Title**: Dual Degree in Biological Science and Psychology

**Program Scheduling:** *In what semester will students start to be admitted?* Spring 2018\_\_\_

**Total Program Credit Hours**:  *126 hours minimum* \_\_144-147\_\_\_\_

**Program Description**: *Provide a brief narrative of the program content (use as much space as needed)*.

This program provides an integrated dual degree program leading to the Bachelor of Science in Biochemistry and the Bachelor of Science in Psychology while maintaining the integrity and program content of each individual degree program. Each program’s requirements are fully met, but significant curricular integrations has been achieved to make the dual degree program feasible in 4 -4.5 years, depending on course load. This integration is largely achieved by the identification of classes that are required for one program, but can also serve as electives in the other; as well as by integrations within general education requirements (in ITP, S classes, and one math class). See the *“Course Requirements*” section for full details of the integration. This program is achievable at a heavy but ≤ 18 ch load in 4 years. We do envision some students doing this, but most likely those entering with some AP or transfer credit. For students with none, we also provide a 9 semester example curriculum which may be more advisable.

**Program Purpose**: *Provide details on the intent of the program and its relation to other programs*.

This program has two main target audiences:

1. Pre-health students (pre-MD, pre-clinical psychologist or psychiatrist) who are interested in neurological or behavioral issues. A challenging double major program will be an asset in professional school application process, and this degree will provide excellent preparation for the MCAT etc.
2. Students interested in moving on to graduate school in studies at the interface of biochemistry and psychology, such as neuroscience, brain science, or cognitive science.

**Program Benefits**: *State the impact of the program for students and for IIT*.

This program will be particularly attractive to students interested in the health professions. Approximately 50% of all medical school applicants and matriculates major in the Biological Sciences. Another 10% of all applicants and matriculates major in the Social Sciences, where Psychology majors are counted. In light of recent changes in the MCAT examination and admissions standards, students who earn a dual degree in Biology and Psychology will be better prepared for entrance examination and have a more diversified portfolio to enhance their competitiveness in the application process.

In addition to medical school, students who graduate from this program will be competitive applicants for students interested in a Masters of Public Health and Genetic Counseling programs who seek candidates with degrees in Biology, Chemistry, Psychology, Social Work or related fields.

In the past 10 years, 3 students have completed the degree requirements for both the Bachelor of Science in Biology and the Bachelor of Science in Psychology. In addition to those, approximately 20 students in each discipline have completed a minor in the other discipline. By creating the dual degree, we increase the likelihood of students who can complete both degree programs in a reasonable time frame, and increase their competitiveness for application to professional schools.

The benefit to IIT is that as an ambitious double major, this program is likely to be attractive to highly desirable very qualified and ambitious students. This has been shown to be case for the dual Biochemistry-Psychology program which has attracted small numbers of high quality students in the two years it has been in existence. This new program involving Biochemistry, instead of biology, is driven by student demand.

By providing an integrated path to both degrees we expect to have an advantage over other schools that may offer each degree separately. These students are likely to go on to careers in the medical fields or go onto post graduate degrees in the sciences, and become highly desirable alumni. This program feeds into a well-defined and well compensated career path, and so students and families are more likely to accept student debt

**Classification of Instructional Programs (CIP) Code** **: N/A**

No CIP code exists for the dual degree; however, because students are obtaining both a BS in Biochjemistry and a BS in Psychology, either CIP code for those degree programs may be utilized.

BS in Biochemsitry, general: 26.0202

BS in Psychology, general: 42.0101

Required to make the program US Financial Aid Eligible - The CIP code takes the following structure: xx.xxxx Where each x is a number between 0 and 9. This 6-digit code identifies, to the greatest specificity possible, an entire instructional program. The classification scheme seeks to comprehensively address all areas of study. Because of the dynamic nature of education, however, new CIP codes are frequently added to the list. The first 2-digits are the first cut off of detail and describe the general discipline of the program. For example, any program with a CIP that starts with 14 is within the Engineering discipline; anything with a 22 is within the legal discipline. The next 2 digits increase the level of detail, and the final 2-digits provide the highest level of detail.

Find CIP codes at <http://nces.ed.gov/ipeds/cipcode>

# PROGRAM VIABILITY

**Competitive Programs**: *Indicate other similar programs locally and nationally detail their success.*

This program is modelled after our successful duel integrated Biology/Psychology program. We noted that many interested students started in BS biochemistry. One switched out to Biology, reluctantly, in order to pursue the dual degree program since no dual with Biochemistry was in place. At the time, the dual was new here, and we did not pursue a new dual with Biochemistry instead. However, we now have another student in BS Biochemistry interested, who also does not want to drop Biochemistry, so **we are pursuing the new program based on actual demonstrated student intertest**.

Integrated dual degree programs are rare. This is good, as it provides IIT with competitive advantage. We have identified one integrated dual Biology/Psychology program:

**Carnegie Mellon University**

[Unified Double Major in Psychology & Biological Sciences](http://coursecatalog.web.cmu.edu/dietrichcollegeofhumanitiesandsocialsciences/departmentofpsychology/#unifieddoublemajorinpsychologyampbiologicalsciences)

This program is a double major that provides one degree, BS in “Biol and Psych” or BS in “Psych and Biol” (depending on home college of the student) since it does not require c.h. in excess of a simple BS degree at CMU. It is hosted in Psychology but utilizes many Biology courses. Our proposal here in describes a dual degree with two degrees conferred with extra c.h. earned.

Many programs between Biology and Psychology exist that provide a mechanism for interdisciplinary study, but no unification of degrees:

**University of Denver** Departments of Biological Sciences or Psychology

[Concentration in Cognitive Neuroscience](http://www.du.edu/nsm/departments/biologicalsciences/degreeprograms/majors/cognitiveneuroscience.html)

Option C - Biology/Psychology Double Major

This appears to be a double major but with no integrations. Both Biology and Psychology offer degrees with specialization in “Cognitive Neuroscience”. This seems to be a cooperative program, but there does not appear to be any special unification for double majors.

Some schools offer distinct degrees not in Biology or Psychology, but in for instance, BioPscyhology or Neural science. These are interfacial programs between biology and psychology that provide one, specialized degree. Typically they have significant enough overlap that double majoring in one of the ‘home’ disciplines is prohibited.

**Tufts**

[Biopsychology](http://ase.tufts.edu/biology/undergraduate/degreeBioPsych.htm)

students may not double major with biology or psychology.

**New York University**

[Degree in Neural Science](http://www.cns.nyu.edu/undergrad/)

Can double major in Psych, but cannot with biology

**Market Analysis for Recruiting Students**: *Detail what work has been done with UG Admissions to identify and recruit potential students.*

Admissions will market this program to students who express an interest in Biology, Biochemsitry, Psychology, Neuroscience, or pre-medicine based on inquiries to IIT or via procured names from testing sources. Both Biology (#4) and Psychology (#2) are among the top 5 majors nationwide.

<http://college.usatoday.com/2014/10/26/same-as-it-ever-was-top-10-most-popular-college-majors/>

Approximately half of the majors within the Biology department have histrocially chosen biochemistry as a major. In addition, Loyola University Chicago has just released a new neuroscience undergraduate major that they announced has already been declared by 242 undergraduates, indicating a strong market for this type of program and competition.

**Market Analysis for Graduates**: *Detail what work has been done with the Career Management Center to identify potential employment opportunities for graduates*.

Graduates with a dual degree in Biology and Psychology will be highly competitive for health professions school admissions and graduate school admission. A brief review of the literature suggests that the intersection of the academic disciplines will offer opportunities as the careers which seek to address complex problems require an approach that is both inter- and multidisciplinary. We will continue to work with CMC to develop opportunities for our graduates.

# ACADEMIC INFORMATION

**Enrollment Estimates**: *Are there enrollment estimates for this program, and if so, what are they and what are they based on? What is the minimum number of students necessary in the program to make the program viable (i.e.to offer classes unique to the program often enough)?*

As a demanding dual major, this program is unlikely to be a high demand major. Based upon the dual Biology/ Psychology program we anticipate 1-2 per year. However, it does serve a significant purpose:

* It serves to distinguish IIT by providing a unique path to this distinctive dual degree
* It provides ‘talking points’ for recruitment to the individual disciplines, even for students who ultimately stick to a single degree.
* It attracts very highly qualified and motivated students

Biology typically has 5-10 incoming students per year and Psychology typically has 10-15 incoming students per year. Many of these express an interest in pre-health.

|  |
| --- |
| **Fall 2017 Enrollment (degree-seeking)** |
| **Class** | **Biochemistry** | **Psychology** | **Grand Total** |
| **U1** |   | 1 | **1** |
| **U2** | 5 | 6 | **11** |
| **U3** | 8 | 6 | **14** |
| **U4** | 4 | 18 | **22** |
| **U5** | 1 | 1 | **2** |
| **Grand Total** | **18** | **31** | **49** |

Degrees awards

|  |  |  |  |
| --- | --- | --- | --- |
|   | BS Biochemistry | BS Psychology | Total |
| **AY 2013** | 5 | 16 | 21 |
| **AY 2014** | 9 | 17 | 26 |
| **AY 2015** | 5 | 19 | 24 |
| **AY 2016** | 8 | 17 | 25 |

While we note that Biochem has less majors and less degrees awarded, it also has the greatest potential for growth as shown by the large numbers of admits for this degree. The comparatively low yield in Biochem might be helped by having this distinctive program available.

|  |  |  |  |
| --- | --- | --- | --- |
| **BCHM & PSYC Admits** |   |  |  |
|  | **Biochemistry** | **Psychology** | **Grand Total** |
| **Fall 2013** | **34** | **32** | **66** |
| Exchange/Visiting Admit |   | 1 | 1 |
| Freshman Admit | 27 | 21 | 48 |
| Transfer Admit | 7 | 10 | 17 |
| **Fall 2014** | **34** | **41** | **75** |
| Exchange/Visiting Admit | 1 | 1 | 2 |
| Freshman Admit | 26 | 35 | 61 |
| Transfer Admit | 7 | 5 | 12 |
| **Fall 2015** | **35** | **29** | **64** |
| Exchange/Visiting Admit |   | 1 | 1 |
| Freshman Admit | 30 | 23 | 53 |
| Transfer Admit | 5 | 5 | 10 |
| **Fall 2016** | **49** | **23** | **72** |
| Exchange/Visiting Admit |   | 0 | 0 |
| Freshman Admit | 45 | 18 | 63 |
| Transfer Admit | 4 | 5 | 9 |
| **Grand Total** | **152** | **125** | **277** |

Given there are no classes unique to the program (all classes are offered with one or the other existing degree programs) a minimum number of students are not required to make the program viable. However, we anticipate 4-5 students will be enrolled based on current enrollment numbers for the two departments and student interest in majoring in one and minoring in the other subject as well as expressed interest of current students in a dual degree program.

**Advising Strategy**: *Since quality advising is a key component of good retention, graduation and career placement, how will students be advised and mentored? Specifically for interdisciplinary programs, how will advising responsibilities be shared? What student professional organizations will be formed? How will the department work with the Career Management Center to develop industry connections?*

Both the departments of Biology (home to BS biochemistry) and Psychology will be responsible for advising of the dual degree students. They will be assigned an advisor from each department and will meet with them on a regular basis and communication will be shared between all parties. In addition, advisors in both departments will track these students in comparison to students in the individual majors to ensure that students in this program are meeting the benchmarks expected of students in the individual majors.

Both departments will continue working with the CMC to develop opportunities for our graduates

**Course Requirements**: *Detail the courses needed for the program including courses currently offered, new courses to be developed (including syllabi), and dependence on courses from other academic units with their commitments to provide these courses on a long-range basis. Include descriptions of laboratories that will need to be developed along with equipment and facilities requirements.*

To integrate the curriculum, the following adjustments have been made:

This is modelled after the previously approved Biology-Psychology dual degree program. Integration is achieved through:

1. **ITP:** Either Psychology or Biology ITP will be accepted
2. **Statistics:** Either MATH 425 or PSYC 203 will satisfy the statistics requirement
3. **Experimental of laboratory classes:** The Psychology experimental research methods course, PSYCH 204, Research Methods in Behavioral Science (4 ch) will be substitute for the free upper level Biochemistry laboratory requirement (3 ch) and one of the two required colloquium classes (1 ch)
4. **Elective swap into Psychology:** two Biochemistry required classes (6 ch) will count as Psychology technical electives (6 ch):
	1. One Biochemistry core class, BIO214, Genetics
	2. one Biochemistry technical elective selected from a list of classes suitable for both Biochem and Psych degree programs. This list is: {BIO430, Physiology; BIO475 Global Health; BIO420 Neurology; FST401, Nutrition}
5. **Elective swap into Biology:** two Psychology core classes (6 ch), PSYCH 414 Neural & Biological Basis Behavior; and PSYCH 426, Cognitive Processes, will count as Biochemistry technical electives (6 ch)
6. **Integration of S classes within general education requirements:** Two S-designated Psychology courses will be counted as S credits towards the IIT core curriculum. The remaining S credit, and the 7th or swing H/S class within the general education requirements must be outside of Psychology.

Courses in 1-5 have been reviewed by both departments as being appropriate within the each discipline. An integration similar to point 6 was approved by UGSC two years ago when a similar dual Biology / Psychology program was approved. With these 6 integration points, a program of 144-147 ch (depending on 3 program choices) is presented, which is ≥16 ch more than the 126-127 ch in Biochemistry or 126 ch in Psychology BS programs, as required for a dual degree program. All courses are currently being offered on a regular basis to satisfy the demands of each academic units individual majors.

NOTE: This is modelled on the Biology / Psychology dual BS/BS degree program, and while these programs are independent, for reference, the way these two dual degree programs are integration points are identical except for:

Within BS Biology, BIO430 is a required class that all students take, and it integrated to count as a PSYCH elective in BS Psychology. In BS Biochemistry, BIO430 is not required, but is a permissible technical elective (quite commonly selected), and we thus integrate this elective slot instead. Since it is an elective, instead of forcing the integrated class to be BIO430 specifically, we have identified 3 additional permissible electives that are acceptable for integration.

Required courses Credit Hours

**Biology Requirements**

BIOL 107, 109, 115, 117, 210, 214, 401, 402, 404, 445, 451, 495 (or CHEM485) 29

**Chemistry Requirements**

CHEM 124, 125, 237, 239, 240, 247, 343, {344 or 438} 26-27

**Physics Requirements**

PHYS 123, 221 8

**Mathematics Requirements**

MATH 151, 152, 251, {425 or PSYC 203} 17-18

**Biochemistry technical elective** 2

**Dual degree elective:**

one of {BIOL 420, 430, 475 or FST401} 3

**Psychology Requirements**

PSYC 221, 204, 303 or 301, 310, 409 or 320 or COM383, 414, 435 or 436, 426, 485 28

**Psychology electives** 6

**ITP**

BIOL100 or PSYC100 2-3

**Computer Science Requirements**

CS105 or CS110 2

**IPRO** 6

**H Requirement**

2xx, 3xx, 3xx 9

**S Requirement**

SSCI/SOC/PS/ECON 3

**H/S Science Requirement** 3

SSCI/SOC/PS/ECON/Humanities

Total Hours 144-147

**Sample Curriculum/Program Requirements**: *Provide a sample semester by semester curriculum and the program requirements, as they would appear in the IIT Undergraduate Programs bulletin*.

8-semester program

This is very demanding, and will probably not be followed except for exceptional students. Mant of these will have several AP credits, and so here will be some looseing of the 18 ch load. However it is presented as an example fo program completion in 4 yrs.



9 semester program

This is a more reasonable program in terms of course load, and for students with no AP or transfer credit, this will be advised.



**Program Outcomes and Assessment Process**: *Provide the program learning goals and assessment plan (for more information contact the Assessment Office within Academic Affairs).
Also see https://sites.google.com/a/iit.edu/student-learning-assessment/*

Program outcomes and assessment are being done by both departments for students in the individual majors and this program will defer to those processes.