Graduate Council Curriculum Report
The Graduate Council Curriculum Report (GCCR), which includes all graduate program curricular proposals approved through the Graduate Council curricular review process, is published 12 times each calendar year.

Questions/comments regarding the GCCR or its contents may be directed to the Director of Graduate Education Administration.

October 14, 2015

1. **Program Change:** Curriculum and Instruction – create three integrated undergraduate-graduate (IUG) degree programs (College of Education), page 2

2. **New Program:** Facilities Engineering and Management – a new M.Eng. degree program offered by the Department of Architectural Engineering (College of Engineering), page 30

3. **New Program:** Social Data Analytics – establish a new dual-title doctoral program and a new graduate minor in Social Data Analytics (College of the Liberal Arts), page 70

4. **Program Change:** Political Science – adoption of the new dual-title doctoral program in Social Data Analytics (College of the Liberal Arts), page 122

5. **Program Change:** Human Resources and Employment Relations - create a B.S. in Psychology / M.S. Human Resources and Employment Relations integrated undergraduate (IUG) degree program, changes to the M.P.S. HRER program curriculum (College of the Liberal Arts), page 190

6. **Program Change:** Information Sciences and Technology – create an integrated undergraduate-graduate (IUG) degree program with B.S. in Information Sciences and Technology and M.S. in Information Sciences and Technology (College of Information Sciences and Technology), page 259

7. **Program Change:** Information Sciences and Technology – create an integrated undergraduate-graduate (IUG) degree program with B.S. in Security and Risk Analysis and M.S. in Information Sciences and Technology (College of Information Sciences and Technology), page 282

Note: Graduate course proposals approved through the Graduate Council curricular review process, as well as information about postbaccalaureate/graduate credit certificates approved by college/school administrators for graduate education, are published in the Senate Curriculum Report.
GRADUATE COUNCIL COMMITTEE ON PROGRAMS AND COURSES
SUBCOMMITTEE ON NEW AND REVISED PROGRAMS AND COURSES PROGRAM,
OPTION, OR MINOR PROPOSAL FORM

Submit 1 copy of the proposal form and 25 copies of the supporting documentation as outlined below to
the Curriculum Coordinator, University Faculty Senate, 101 Kern Graduate Building.

College Department or Instructional Area

College of Education
Curriculum and Instruction

NEW PROGRAM, OPTION OR MINOR
(Not Applicable)

OLD PROGRAM, OPTION, OR MINOR: Change ___ X ___ Drop _____
Old designation of program Master of Education (M.Ed.)
Old designation of option
Old designation of minor

New designation of program New
designation of option
(no change)
Integrated B.S. in Biology/M.Ed. in Curriculum and Instruction,
Integrated B.S. in Chemistry/M.Ed. in Curriculum and Instruction, Integrated
B.S. in Mathematics/M.Ed. in Curriculum and Instruction

New designation of minor

Indicate effective date Fall, 2013

Prepared by William S. Carlson, Prof. of Science Education 11/2/2012
Rose Mary Zbiek, Prof. of Mathematics Education 01/04/2013

SUBMITTED BY In Charge of Graduate Program Date 3/14/13

NOTED BY College Rep to Grad Council Subcommittee on New and Revised Programs and Courses
Date 3/18/15

APPROVED BY Dean of College
Date 3/18/13

RECOMMENDED BY On behalf of Luisa
Date 10/14/2015
Subcommittee on New and Revised Programs and Courses

On behalf of Ann Forsids
Date 10/14/2015
Committee on Programs and Courses

NOTED BY Deon of the Graduate School
On behalf of Regina Vasiliou-Young
Date 10/14/2015
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Integrated B.S./M.Ed. IUG Proposal

Overview: Science and Mathematics

Each of the proposed IUGs draws upon two existing degrees (a B.S. in a scientific field and the M.Ed. in Curriculum and Instruction), permitting students (through two-college advising and early enrollment in 500-level courses) to complete a program of professional preparation that could otherwise take more than ten semesters. Separate proposals for the undergraduate components of the IUG have been submitted to the Faculty Senate Committee on Curricular Affairs. We were instructed by the Senate Office to follow its written instructions for “Changes in Majors, Options, and Minors,” not its instructions for “New Majors, Options, and Minors.” We have used the same approach here, for consistency.

Although the primary goal of these combined-degree programs is teacher preparation, Penn State’s teacher certification requirements are not the same as its degree program requirements. Neither of the B.S. degrees in Biology and Chemistry nor the M.Ed. in Curriculum and Instruction currently requires that students complete all teacher certification requirements to receive their degrees, and that same independence has been retained in the combined-degree options for Biology and Chemistry students. This will provide an option for science students who (perhaps late in their programs) decide that they wish to teach in settings for which teacher certification is not required, such as private schools, nature centers, or museums. The IUG in Mathematics/Mathematics Education will require students to complete all certification requirements to receive the M.Ed. degree.
I. SCIENCE: BIOLOGY AND CHEMISTRY

A. Proposed Revisions (summary table of changes)

In the right-hand column, **Bold** indicates new text and *italics* are for notes that are detailed below the table.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Current M.Ed. program</th>
<th>Proposed B.S./M.Ed. IUG program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree-specific admissions requirements</td>
<td>Scores from the MAT or GRE exam</td>
<td>Scores from the MAT or GRE exam</td>
</tr>
<tr>
<td>Required curriculum course (3 credits)</td>
<td>C I 550(3) or equivalent (CORE)</td>
<td>SCIED 550(3) or C I 550(3) (CORE)</td>
</tr>
<tr>
<td>Required learning theory course (3 credits)</td>
<td>EDPSY 421(3) or equivalent (CORE)</td>
<td>EDPSY 421(3), or SCIED 552(3), or equivalent (CORE) <em>(Notes 1, 5)</em></td>
</tr>
<tr>
<td>Required research course (3 credits)</td>
<td>C I 400(3) or equivalent (CORE)</td>
<td>SCIED 558(3), or C I 501(3) or equivalent (CORE) <em>(Notes 2, 5)</em></td>
</tr>
<tr>
<td>Required research ethics training (1 credit)</td>
<td>C I 590(1)</td>
<td>C I 590(1)</td>
</tr>
<tr>
<td>Minimum number credits at 400/500 level</td>
<td>30 credits</td>
<td>30 credits</td>
</tr>
<tr>
<td>Minimum number of above credits that must be at the 500 level</td>
<td>18 credits <em>(Note 3)</em></td>
<td>18 credits <em>(Note 3)</em></td>
</tr>
<tr>
<td>Number of credits that may dual-count toward undergraduate and graduate degrees</td>
<td>Not applicable</td>
<td><strong>Maximum of 12 credits, of which at least half must be at the 500 level</strong></td>
</tr>
<tr>
<td>Culminating project</td>
<td>Master’s paper/project</td>
<td>Master’s paper/project</td>
</tr>
</tbody>
</table>

*(Note 1)* SCIED 552(3), “Science teaching and learning,” is a graduate-level course on learning theory that focuses specifically on science learning at the precollege level, with exploration of the implications of research on science learning for teachers and teacher educators.

*(Note 2)* SCIED 558(3), “Research problems in science teaching,” will be offered concurrently with graduate-level student teaching, and is intended to support M.Ed. students’ studies of classroom practice during that clinical experience. C I 501(3), “Teacher inquiry,” is a graduate level course that is taught more frequently than C I 400(3) and that focuses on research in classrooms, which is appropriate for pre-service teachers.

*(Note 3)* Up to 6 credits of 500-level coursework may be applied to both degrees (B.S. and M.Ed.), from among SCIED 550(3), SCIED 552(3), SCIED 558 (3), and C I 595(6).

*(Note 4)* IUG students typically student teach in the fall semester, which entails enrollment in SCIED 558(3), C I 595E(6), and C I 496(6). In their final spring semester—which may occur before or after their student teaching semester, students generally enroll in SCIED 550(3), one or two other 500-numbered courses in the College of Education, and one or two 400/500-level science courses. Please note that the final spring course of study is highly individualized, based on factors such as whether the student is pursuing certification in a second science subject, whether the student is finishing the program in a fall or spring semester, and whether the student completed 500-level coursework in the
“undergraduate” phase of the program. Negotiating these options is done in close consultation with the student’s assigned SCIED advisor.

(Note 5) The existing M.Ed. requires core courses in three areas: curriculum, learning theory, and research. The proposed IUGs would include STAT 500 for C I 400 as the required statistics course in the interest of an overall program that meets the Pennsylvania Department of Education Biology and Chemistry 7-12 requirements, allows students to benefit from dual-counted credits from 500-level courses, maintains an acceptable number of total credits, and allows necessary flexibility in scheduling around field experiences in schools and laboratory experiences on campus.

Sample semester plans for junior, senior, and graduate years for each of the Biology and Chemistry paths appear in the charts that appear below. In both charts, bold font represents courses counting towards the M.Ed. and italics indicates courses that count for both degrees.

<table>
<thead>
<tr>
<th>BIOLOGY</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junior Year</td>
<td>BIOL 4XX (3)</td>
<td>BIOL 4XX (3)</td>
</tr>
<tr>
<td></td>
<td>BIOL 400 (1)</td>
<td>SCIED 550 (3)</td>
</tr>
<tr>
<td></td>
<td>PHYS 251 (3) (GN)</td>
<td>SPLED 400 (3)</td>
</tr>
<tr>
<td></td>
<td>CI 280 (3) (GH)</td>
<td>BIOL 400 (1)</td>
</tr>
<tr>
<td></td>
<td>GA/IL (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GHA (1.5)</td>
<td></td>
</tr>
<tr>
<td>Senior Year</td>
<td>BIOL 4XX (3)</td>
<td>BIOL 4XX (3)</td>
</tr>
<tr>
<td></td>
<td>SCI 411 (3)</td>
<td>BIOL 400 (1)</td>
</tr>
<tr>
<td></td>
<td>SCI 552 (3)</td>
<td>SCI 412 (3)</td>
</tr>
<tr>
<td></td>
<td>ENG 202C (3)</td>
<td>CI 495C (3)</td>
</tr>
<tr>
<td></td>
<td>CI 590 (1)</td>
<td>GA/IL (3)</td>
</tr>
<tr>
<td></td>
<td>BIOL 400 (1)</td>
<td></td>
</tr>
<tr>
<td>Graduate Year</td>
<td>SCI 558 (3)</td>
<td>EDTD 500 - level (3)</td>
</tr>
<tr>
<td></td>
<td>CI 496A (6)</td>
<td>SCI 551 (3)</td>
</tr>
<tr>
<td></td>
<td>CI 595 (6)</td>
<td>BIOL 4XX (3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHEMISTRY</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junior Year</td>
<td>CHEM 316 (1)</td>
<td>CHEM 423W (4)</td>
</tr>
<tr>
<td></td>
<td>CHEM 400 (1)</td>
<td>CHEM 494 (1)</td>
</tr>
<tr>
<td></td>
<td>CHEM 476 (3)</td>
<td>STAT 401 (3)</td>
</tr>
<tr>
<td></td>
<td>CHEM 294 (2)</td>
<td>SPLED 400 (3)</td>
</tr>
<tr>
<td></td>
<td>CHEM 457 (2)</td>
<td>SCI 550 (3)</td>
</tr>
<tr>
<td></td>
<td>CI 280 (3) (GH)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GA/IL (3)</td>
<td></td>
</tr>
<tr>
<td>Senior Year</td>
<td>CHEM 4XX (3)</td>
<td>CHEM 450 (3)</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Graduate Year</td>
<td>SCIED 558 (3)</td>
<td>CI 496A (6)</td>
</tr>
</tbody>
</table>

### B. Justification for Changes

The purpose of this IUG option is to enhance the quality and affordability of a sequential program of studies that is already taking place at Penn State and at many other universities: the combination of an undergraduate degree in a science discipline with a professional master’s degree in an educational specialization. By integrating the two degrees, students will typically reduce their time to completion by at least one semester, roughly corresponding to the 12 credits of 400/500 level coursework that can be double counted for both degrees. In addition, the IUG option will better engage students concurrently in studies of science and science education, which provides valuable opportunities for reflection on how science is taught and learned. This program option will be very selective: we anticipate admitting approximately 2-4 students a year. Eberly College of Science (ECOS) majors who are not admitted to the IUG will still have the opportunity to begin professional education studies as Penn State undergraduates, as many now do, and less accelerated options will continue to be more appropriate for some students.

The requirements for teacher certification in Pennsylvania are complex and change frequently. Over the past 15 years, faculty and staff in ECOS and Education have become adept at exploiting opportunities to streamline students’ programs of studies and to accommodate these frequent changes. However, PA certification requirements continue to expand, and it is clear that if we are going to offer viable pathways for five-year professional studies (a necessity, given the competition from a large number of other Pennsylvania and online certification programs), planning needs to begin early in a student’s undergraduate career. By having a formal IUG, the University signals both its belief in the importance of science teaching and its commitment to making sure that it is an attractive and affordable option for its strongest science students.

We do not believe that these curricular changes alone are likely to lead to a significant increase in biology and chemistry enrollments, although some modest increases (on the order of 4-8 students/year, total) are possible, via two mechanisms: (1) an increase in the number of ECOS students who choose to complete their certification requirements with a master’s degree rather than with a bachelor’s degree (those who currently take the latter option usually need more than eight semesters), and (2) through the recruitment of new ECOS undergraduates who might otherwise enroll at colleges and universities that already offer five-year programs.

### C. Written Response from Affected Departments
Letters are appended to the end of this document from the Departments of Biology and Chemistry. Because this proposal primarily functions to combine existing programs of study and better serve students who already enroll in required courses, it will have relatively little impact on other units.

Letters are also appended from the deans of the Colleges of Education and Science.
II. MATHEMATICS

A. Proposed Revisions (summary table of changes)

In the right-hand column, **Bold** indicates new text.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Current M.Ed. program</th>
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<tr>
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<td>EDPSY 421(3) or equivalent (CORE)</td>
</tr>
<tr>
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<td>STAT 500(3) or equivalent (CORE)</td>
</tr>
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<td>C I 590(1)</td>
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<td>30 credits</td>
</tr>
<tr>
<td>Minimum number of above credits that must be at the 500 level</td>
<td>18 credits</td>
<td>18 credits</td>
</tr>
<tr>
<td>Number of credits that may dual-count toward undergraduate and graduate degrees</td>
<td>Not applicable</td>
<td>Maximum of 12 credits, of which at least half must be at the 500 level (Note 2)</td>
</tr>
<tr>
<td>Culminating project</td>
<td>Master’s paper</td>
<td>Master’s paper</td>
</tr>
</tbody>
</table>

(Note 1) During a semester of student teaching, students register for only C I 495E.

(Note 2) The intended courses to dual-count are MTHED 511(3), STAT 501(3), STAT 502(3), and a 400-level mathematics elective (3) chosen in consultation with advisers. Variation across students might occur due to unanticipated changes in course offerings.

(Note 3) The existing M.Ed. requires core courses in three areas: curriculum, learning theory, and research. The proposed IUG uses STAT 500 for C I 400 as the required statistics course in the interest of an overall program that meets the Pennsylvania Department of Education Mathematics 7-12 requirements, allows students to benefit from 12 dual-counted credits from 500-level courses, maintains an acceptable number of total credits, and provides a richer statistics basis for the IUG student.

Sample semester plans for junior, senior, and graduate years appear in the charts below, the second of which includes an additional summer as an alternative for students who wish to draw on their field experiences as they write their master's paper. In both charts, bold font represents courses counting towards the M.Ed. and italics indicates courses that count for both degrees.

<table>
<thead>
<tr>
<th>FIVE ACADEMIC YEARS</th>
<th>Fall</th>
<th>Spring</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junior Year</td>
<td>MATH/STAT 414 (3)</td>
<td>MATH/STAT 415 (3)</td>
<td><strong>MATH 485/486 (3)</strong></td>
</tr>
<tr>
<td></td>
<td>MATH 435 (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EDTHP 400-level elective (3)</td>
<td>MATH 471 (4)</td>
<td>MATH 400-level elective (3)</td>
</tr>
<tr>
<td>----------</td>
<td>-------------------------------</td>
<td>--------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td></td>
<td>CAS 100 (3)</td>
<td>ENGL 202C (3)</td>
<td>SPLED 403B (3)</td>
</tr>
<tr>
<td>Senior Year</td>
<td>ARTS (GA) (3)</td>
<td>HUMANITIES (GH) (3)</td>
<td>MTHED 411 (3)</td>
</tr>
<tr>
<td></td>
<td>GHA (1.5)</td>
<td>GHA (1.5)</td>
<td>MTHED 427 (3)</td>
</tr>
<tr>
<td></td>
<td>SPLED 400 (4)</td>
<td>MTHED 400- or 500-level elective (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ARTS (GA) (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>STAT 500 (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C 1590 (1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Graduate Year | MTHED 412W (3) | C 1495E (15) (student teaching) |
|               | C 1495C (3)    |                               |
|               | EDPSY 421 (3)  |                               |
|               | MTHED 511 (3)  |                               |
|               | MTHED 596 (3)  |                               |
|               | (paper writing)|                               |

<table>
<thead>
<tr>
<th>ADDITIONAL SUMMER</th>
<th>Fall</th>
<th>Spring</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junior Year</td>
<td>MATH/STAT 414 (3)</td>
<td>MATH/STAT 415 (3)</td>
<td>MTHED 520 (3)</td>
</tr>
<tr>
<td></td>
<td>MATH 435 (3)</td>
<td>MATH 485/486 (3)</td>
<td>C 1550 (3)</td>
</tr>
<tr>
<td></td>
<td>EDTHP 400-level elective (3)</td>
<td>MATH 471 (4)</td>
<td>C 1590 (1)</td>
</tr>
<tr>
<td></td>
<td>CAS 100 (2)</td>
<td>ENGL 202C (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ARTS (GA) (3)</td>
<td>HUMANITIES (GH) (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GHA (1.5)</td>
<td>GHA (1.5)</td>
<td></td>
</tr>
<tr>
<td>Senior Year</td>
<td>MTHED 484 (3)</td>
<td>MATH 400-level elective (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MTHED 436 (3)</td>
<td>SPLED 403B (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SPLED 400 (4)</td>
<td>MTHED 411 (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ARTS (GA) (3)</td>
<td>MTHED 427 (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STAT 500 (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate Year</td>
<td>MTHED 412W (3)</td>
<td>C 1495E (15) (student teaching)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C 1495C (3)</td>
<td>STAT 501 (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EDPSY 421 (3)</td>
<td>MTHED 596 (3)</td>
<td>(paper writing first summer session)</td>
</tr>
<tr>
<td></td>
<td>MTHED 511 (3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. Justification for Changes

The purpose of this IUG option is to complement mathematics and mathematics education degree and certification programs by providing an efficient and enriched experience for highly qualified and motivated students. Students would delve deeply into the content area of mathematics and statistics, receive substantial training in modern mathematics pedagogy, investigate current educational research as a tool for improving learning and teaching, and be prepared to apply for secondary mathematics teaching certification.
The undergraduate mathematics degree will ensure that students graduating from the program are recognized by school districts as having achieved a high level of education in mathematics and statistics. The master's degree in education will provide students with graduate level preparation in the theory and practice of teaching in addition to courses and experiences required for certification to teach mathematics in grades 7-12 in Pennsylvania. Mathematics departments in secondary schools have a continuing need for mathematics teachers with strong mathematics and statistics content knowledge and sound teacher preparation like that which this program is designed to provide.

This IUG option will enable qualified students to complete, in the most efficient way possible, the two degree programs and the certification program, and thus shorten the total time required for them to enter the teaching profession with a unique profile in both content and pedagogy. There is a national call to increase the number of quality STEM teachers and this IUG will help serve to document Penn State’s commitment in this important area.

These curricular changes alone are unlikely to lead to a significant increase in mathematics enrollments. A modest increase (on the order of 1-5 students/year) is possible, via the following mechanisms: (1) recruitment of students who are attracted to the statistics emphasis in the proposed IUG, and (2) recruitment of undergraduates who might otherwise enroll at colleges and universities that already offer five-year programs.

C. Written Response from Affected Departments

A letter from the Department of Mathematics is included. Because this proposal primarily functions to combine existing programs of study and better serve students who already enroll in required courses, it will have relatively little impact on other units. However, because the program would draw on existing statistics courses to increase the statistical preparation of secondary mathematics teachers, a letter from the Department of Statistics is attached. We also include support from the two other Penn State entities that offer secondary mathematics teacher certification programs: (a) the Penn State Erie, The Behrend College’s Mathematics Department and (b) the School of Behavioral Sciences and Education, Penn State Harrisburg.

Letters are also appended from the deans of the Colleges of Education and Science.
Proposed Revisions (Graduate Bulletin copy)

Curriculum and Instruction (C I)

Program Home Page

ROSE MARY ZBIEK, Director of Graduate Studies for Curriculum and Instruction
272 Chambers Building
814-863-1210
rmz101@psu.edu

Degrees Conferred:

Ph.D., M.S., M.Ed.
Integrated B.S. in Special Education/M.Ed. in Curriculum and Instruction
Integrated B.S. in Biology/M.Ed. in Curriculum and Instruction
Integrated B.S. in Chemistry/M.Ed. in Curriculum and Instruction
Integrated B.S. in Mathematics/M.Ed. in Curriculum and Instruction

The Graduate Faculty
• E. Frances Arbaugh, Ph.D. (Indiana) Associate Professor of Education
• Bernard J. Badiali, Ph.D. (Penn State) Associate Professor of Education
• Mandy Biggers, Ph.D. (Iowa) Assistant Professor of Education
• Gail M. Boldt, Ph.D. (Hawaii) Associate Professor of Education
• William S. Carlsen, Ph.D. (Stanford) Professor of Education
• Kathleen M. Collins, Ph.D. (Michigan) Assistant Professor of Education
• Richard A. Duschl, Ph.D. (Maryland) Waterbury Chair in Secondary Education
• Jacqueline Edmondson, Ph.D. (Penn State) Professor of Education
• Daniel D. Hade, Ph.D. (Ohio State) Associate Professor of Education
• Leigh Ann Haefner, Ph.D. (Penn State) Associate Professor of Education
• M. Kathleen Held, Ph.D. (Maryland) Distinguished Professor of Education
• Mariko Henada, Ph.D. (Toronto) Associate Professor of Education
• Steven L. Herb, Ph.D. (Penn State) Librarian; Head, Education Library, Affiliate Associate Professor of Education
• Patricia H. Hinchey, Ed.D. (Columbia) Professor of Education
• Elisa Hopkins, Ph.D. (Penn State) Assistant Professor of Education
• Megan Hopkins, Ph.D. (UCLA) Assistant Professor of Education
• James E. Johnson, Ph.D. (Wayne State) Professor of Education
• Gregory J. Kelly, Ph.D. (Cornell) Professor of Education
• Mark Kissling, Ph.D. (Michigan State) Assistant Professor of Education
• Allison Koostikas, Ph.D. (Penn State) Assistant Professor of Education
• Ravinder Kou, Ph.D. (Penn State) Associate Professor of Education
• Gwendolyn M. Lloyd, Ph.D. (Michigan) Professor of Education
• Andrea V. McCloskey, Ph.D. (Indiana) Assistant Professor of Education
• Scott P. McDonald, Ph.D. (Michigan) Associate Professor of Education
• Scott A. Metzger, Ph.D. (Michigan State) Associate Professor of Education
• Jamie M. Myers, Ph.D. (Indiana) Professor of Education
• James F. Nolan, Ph.D. (Penn State) Hermanowicz Professor of Education
• Julia Plummer, Ph.D. (Michigan) Associate Professor of Education
• Matthew E. Poehner, Ph.D. (Penn State) Associate Professor of Education
• Kimberly A. Powell, Ph.D. (Stanford) Associate Professor of Education
• Jacqueline Reid-Walsh, Ph.D. (McGill) Associate Professor of Education
• David W. Saxe, Ph.D. (Illinois) Associate Professor of Education
• Stephanie C. Serriere, Ph.D. (Indiana) Assistant Professor of Education
• Patrick W. Shannon, Ph.D. (Minnesota) Professor of Education
• Kathleen A. Silliman, Ph.D. (Penn State) Assistant Professor of Education
• Elizabeth Snolicic, Ph.D. (Penn State) Assistant Professor of Education
• Jeanine M. Staples, Ph.D. (Pennsylvania) Associate Professor of Education
• Iris M. Striedieck, D.Ed. (Penn State) Assistant Professor of Education
• Dana L. Stuchul, Ph.D. (Penn State) Associate Professor of Education
• Daniel K. Thompson, Ph.D. (Iowa) Assistant Professor of Education
• Joseph Valente, Ph.D. (Arizona State) Assistant Professor of Education
• Anne E. Whitney, Ph.D. (California) Associate Professor of Education
• Vivian Yenika-Agbaw, Ph.D. (Penn State) Associate Professor of Education
• Rose Mary Zbiek, Ph.D. (Penn State) Professor of Education
• Carla M. Zembal-Saul, Ph.D. (Michigan) Professor of Education

This program provides advanced professional preparation in the special areas of bilingual education, curriculum and supervision, early childhood education, elementary education, instructional leadership, language and literacy education, science education, social studies education, and mathematics education.

Admission Requirements

Scores from the Miller Analogies Test (MAT) or the Graduate Record Examinations (GRE) are required for admission. However, applicants for the doctoral degree are strongly encouraged to take the GRE. Moreover, students with excellent academic records who wish to be considered for fellowships, scholarships, and assistantships should take the GRE as a matter of course. At the discretion of an emphasis area, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. Each IUG might have additional requirements. Applications must be submitted via the Graduate School.

Students with appropriate course and professional backgrounds will be considered for admission, subject to the limitation of program facilities. For admission to the professional degree programs leading to the M.Ed., teaching or equivalent experience and at least 18 credits in education are recommended.

Master's Degree Requirements

M.Ed. and M.S. candidates are expected to complete C I 590(1) as well as the core of one course in each of three areas: learning/foundation (EDPSY 421, EDPSY 526, SCIED 552, C I 560), research (C I 400, C I 501, SCIED 558, STAT 500, EDPSY 400), and curriculum (C I 550, C&S 551, SCIED 550), or the equivalent, as well as C I 590(1). Through C I 590, students complete Scholarship and Academic Research Integrity (SARI) training. M.S. candidates are required to enroll in six credits of thesis research (C I 600 or 610) as they plan, conduct, and report a master's research thesis. M.Ed. candidates submit a professional master's culminating project paper.

Doctoral Degree Requirements

The completion of a core of competencies in curriculum, instruction, and supervision with at least one course in each area is expected of Ph.D. candidates. Additional course are requirements include courses in an emphasis area, in quantitative or qualitative research methods, and in supporting courses that extend or
complement the emphasis area. Emphasis areas include curriculum and supervision; early childhood education; language, literacy and culture; mathematics education; and science education. All students complete Scholarship and Academic Research Integrity (SARI) training through C I 590(1). In addition, each student completes all Degree Requirements of the Ph.D. and produces and defends a doctoral dissertation.

To meet residency requirements, the Ph.D. candidate must spend at least two consecutive semesters enrolled as a full-time student at the University Park campus. For additional requirements, please see the Graduate School’s degree requirements for doctoral degrees: http://bulletins.psu.edu/graduate/degreerequirements/.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin.

Integrated B.S. in Special Education/M.Ed. in Curriculum and Instruction

The Special Education and Curriculum and Instruction with emphasis in Language and Literacy Education Integrated Undergraduate-Graduate (SE/CI-LLED IUG) leading to certification as a Reading Specialist.

The Special Education and Curriculum and Instruction with Emphasis in Language and Literacy Education Integrated Undergraduate-Graduate (SE/CI-LLED IUG) Degree Program consists of integration of required courses for a B.S. in Special Education with courses required for certification as a Reading Specialist and a M.Ed. in Curriculum and Instruction with emphasis in Language and Literacy Education (LLED). The five-year, SE/CI-LLED IUG is an option for highly qualified students seeking certification to teach Special Education in Pennsylvania in grades K-12. Students in this IUG will be taught how to design and deliver appropriate instruction based on individual needs and incorporate a variety of materials and strategies. Students are expected to complete courses required for the graduate level K-12 reading specialist integrated with their undergraduate experiences and coursework in Special Education and will complete a summer practicum in an on-campus reading clinic as well as a capstone Special Education teaching experience in their final semester. Completion of the IUG (along with earning a passing score on PDE required content tests) leads to a B.S. in Special Education, certification in special education and as a reading specialist in the state of Pennsylvania, and a M.Ed. in Curriculum and Instruction.

In addition to the admission requirements for the Curriculum and Instruction M.Ed., admission to the SE/CI-LLED IUG Reading Specialist program will be based upon having attained a minimum GPA of 3.5 in Special Education courses, with a grade of B or better in SPLED 412. Admission will be based on a recommendation by the Reading Specialist Program Coordinator in consultation with the Coordinator of Teacher Education in Special Education.

For the B.S./M.Ed. Degree in integrated Special Education B.S. and Curriculum and Instruction M.Ed., a minimum of 150 credits is required. Up to 12 credits can apply to both undergraduate and graduate degrees; half of these must be at the 500-level. Students who have been accepted into the IUG program but are unable to complete the M.Ed. in Curriculum and Instruction may be awarded the B.S. in Special Education after having completed all degree requirements for the B.S.

Master of Education (IUG in Special Education/ Curriculum and Instruction)

CURRICULUM AND INSTRUCTION M.Ed. (30 credits)
Integrated B.S./M.Ed. IUG Proposal

(IUG in Special Education/Curriculum and Instruction)

Core Areas (9 credits - choose one course from each area):
Curriculum: C I 550
Research: C I 501 or EDPSY 400
Learning: EDPSY 421, EDPSY 545, or HD FS 429

Emphasis in Language and Literacy Education with Reading Specialist (* denotes required courses)

Note: A Master's paper is required for completion of the M.Ed.

A passing score on the state-required Reading Specialist Exam (qualifying score of 570) is required for
Reading Specialist certification.
[Proposed new text concerning the Biology IUG option follows]

Integrated B.S. in Biology/M.Ed. in Curriculum and Instruction

This Integrated Undergraduate/Graduate (IUG) degree program combines the Bachelor of Science in Biology with the Master of Education in Curriculum and Instruction, Science Education emphasis. The program is designed to be completed in five years. The program enables highly qualified and motivated students to delve deeply into a scientific content area and to pursue graduate level preparation in the theory and practice of teaching. Most students in this option intend to seek Pennsylvania teacher certification, and a semester of student teaching comprises part of their final year of studies. The IUG may also be suitable for a student who does not need to become certified, because they intend to teach in a private secondary school or a non-formal educational setting; in such cases, the second graduate semester will be a program of studies determined through consultation with the graduate advisor and customized for the student’s specific needs.

For specific instructions on applying to the program, please consult the “Application Process” section of the IUG description for the Biology B.S. degree in the Undergraduate Bulletin. Students shall be admitted to the program no earlier than the beginning of the third semester of undergraduate study and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. Application materials to be submitted include a current undergraduate transcript, statement of purpose, draft plan of study, two letters of recommendation, and concurrent submission of an application for master’s study to the graduate program in Curriculum and Instruction, Science Education emphasis area. In addition, a minimum GPA of 3.5 in Science and Education courses is required. Admission will be based on a recommendation by the Science Education Program Coordinator in consultation with the Associate Chair for Undergraduate Education in the Biology Department. Additional details about the graduate application procedure can be found above in the section, “Admissions Requirements.” Applications must be submitted via the Graduate School.

IUG students fulfill all degree requirements for a B.S. in the Eberly College of Science. If a student chooses to leave the program without completing M.Ed. requirements, he or she may still receive the relevant B.S. degree, after all B.S. requirements are completed.

For the M.Ed. degree, students must earn at least 30 credits at the 400/500 level, at least 18 of them at the 500 level. One graduate semester is usually devoted to full time student teaching. Additional graduate coursework is completed in a second semester. Courses required for the M.Ed. degree include a course in learning theory (e.g., SCIED 552(3)), a course in research methods (e.g., SCIED 558(3)), a course in curriculum (e.g., SCIED 550), and a course in research ethics (C I 590(1)).

Students pursuing teacher certification (the usual option) additionally complete a 500-level EDTHP course (3), C I 595(6), and C I 496(6). SCIED 558(3), C I 496(6), and C I 595(6) comprise the student-teaching semester course load. Students who are not pursuing teacher certification substitute 15 credits of other 400- or 500-level coursework for the student teaching semester; those courses are selected in consultation with their advisors, in order to address the students’ specific career aspirations.

124 credits are required for the B.S. degree and 30 credits for the M.Ed. degree. The following courses may be double-counted toward both the B.S. and the M.Ed. degrees, up to a limit of 12 credits: EDTHP 500-level courses (3), SCIED 411(3), SCIED 412(3), and SCIED 500-level courses. Note that at least 50% of credits proposed for double-counting must be at the 500 level.
In addition to the double-counted courses taken during the first four years, the timeline for the M.Ed. is one year that includes these specified courses. The program is designed to be finished in five years.

There are a number of other requirements for Pennsylvania teacher certification, including state-required tests and clearances, as well as coursework that can be completed at either the undergraduate or graduate level. Some courses, not enumerated above, that are usually required to satisfy teacher certification requirements include C I 280(3), SPLED 400(3), and C I 495C(3).

Please note that changes in Pennsylvania certification requirements are common; students should check the Certification FAQ page at the Penn State Science Education website for updates and clarification about the specific requirements that affect them, based on their admission date to the IUG program option. Note also that students in the IUG program option are not required to complete all Penn State teacher certification requirements in order to receive their B.S. and M.Ed. degrees, as long as they have completed the requirements for those degrees, as described in the undergraduate and graduate Bulletins. For example, a student who has completed all degree requirements but has not yet received a score for the Pennsylvania-required Biology content exam may be awarded both of his or her earned degrees.

[Proposed new text concerning the Biology IUG option ends here.]
[Proposed new text concerning the Chemistry IUG option follows]

Integrated B.S. in Chemistry/M.Ed. in Curriculum and Instruction

These Integrated Undergraduate/Graduate (IUG) degree programs combine the Bachelor of Science in Chemistry with the Master of Education in Curriculum and Instruction, Science Education emphasis. The programs are designed to be completed in five years. The programs enable highly qualified and motivated students to delve deeply into a scientific content area and to pursue graduate level preparation in the theory and practice of teaching.

For detailed instructions on applying to the program, please consult the “Application Process” section of the IUG description for the Chemistry B.S. degree in the Undergraduate Bulletin. Students shall be admitted to the program no earlier than the beginning of the third semester of undergraduate study and no later than the end of the second week of the semester preceding the semester of expected conferal of the undergraduate degree. Application materials to be submitted include an undergraduate transcript, statement of purpose, draft plan of study, two letters of recommendation, and concurrent submission of an application for master’s study to the graduate program in Curriculum and Instruction, Science Education emphasis area. In addition, a minimum GPA of 3.5 in Science and Education courses is required. Admission will be based on a recommendation by the Science Education Program Coordinator in consultation with the Associate Chair for Undergraduate Education in the Chemistry Department. Additional details about the graduate application procedure can be found above in the section, “Admissions Requirements.” Applications must be submitted via the Graduate School.

IUG students fulfill all degree requirements for a B.S. in the Eberly College of Science. If a student chooses to leave the program without completing M.Ed. requirements, he or she may still receive the relevant B.S. degree, after all B.S. requirements are completed.

For the M.Ed. degree, students must earn at least 30 credits at the 400/500 level, at least 18 of them at the 500 level. One graduate semester is devoted to full time student teaching. Additional graduate coursework is completed in a second graduate semester. Courses required for the M.Ed. degree include SCIED 552(3), SCIED 558(3), a 500-level EDTHP course (3), C I 590(1), C I 595(12), and a 500-level course in curriculum (e.g., SCIED 550(3)). Of these, SCIED 558(3) and C I 595(12) comprise the student teaching semester course load.

124 credits are required for the B.S. degree and 30 credits for the M.Ed. degree. The following courses may be double-counted toward both the B.S. and the M.Ed. degrees, up to a limit of 12 credits: EDTHP 500-level courses (3), SCIED 411(3) & SCIED 412(3), and SCIED 500-level courses. Note that at least 50% of credits proposed for double-counting must be at the 500 level. In addition to the double-counted courses taken during the first four years, the timeline for the M.Ed. is one year that includes these specified courses. The program is designed to be finished in five years.

There are a number of other requirements for Pennsylvania teacher certification, including state-required tests and clearances, as well as coursework that can be completed at either the undergraduate or graduate level. Some courses, not enumerated above, that are usually required to satisfy teacher certification requirements include C I 280(3), SPLED 400(3), and C I 495C(3). Please note that changes in Pennsylvania certification requirements are common; students should check the Certification FAQ page at the Penn State Science Education website for updates and clarification about the specific requirements that affect them, based on their admission date to the IUG program option. Note also that students in the IUG program option are not required to
complete all Penn State teacher certification requirements in order to receive their B.S. and M.Ed. degrees, as long as they have completed the requirements for those degrees, as described in the undergraduate and graduate Bulletins. For example, a student who has completed all degree requirements but has not yet received a score for the Pennsylvania-required Chemistry content exam may be awarded both of his or her earned degrees.

[Proposed new text concerning the Chemistry IUG option ends here.]
[Proposed new text concerning the Mathematics IUG option follows]

Integrated B.S. in Mathematics/M.Ed. in Curriculum and Instruction

The Mathematics and Curriculum Instruction with Emphasis in Mathematics Education Integrated Undergraduate-Graduate (MATH/CI-MTHED IUG) Degree Program consists of the integration of required courses for a B.S. in Mathematics Systems Analysis Option, a M.Ed. in Curriculum and Instruction with emphasis in Mathematics Education (MTHED), and Pennsylvania certification for Mathematics Grades 7-12.

The MATH/CI-MTHED IUG is a five-year program for highly qualified students seeking to teach mathematics at the secondary level. A hallmark of the program is its strong statistics strand in combination with its mathematics core. In addition to developing advanced understanding of mathematics and statistics, students will learn how to develop and implement lessons and to incorporate technology and research in instruction designed to reach all students.

Students are expected to complete courses required for the certification program integrated with their undergraduate and graduate experiences and will likely complete one summer in residence. Completion of the IUG (along with earning a passing score on Pennsylvania Department of Education required test[s]) leads to a B.S. in Mathematics, certification in Mathematics Grades 7-12, and a M.Ed. in Curriculum and Instruction.

Students shall be admitted to the program no earlier than the beginning of the third semester of undergraduate study and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. Admission to the MATH/CI-MTHED IUG Mathematics Grades 7-12 program will be based upon having attained a minimum GPA of 3.5 after completing at least 60 credits of the program, with a grade of C or better in all courses. Application materials to be submitted include a current undergraduate transcript, statement of purpose, draft plan of study, two letters of recommendation, and concurrent submission of an application for master’s study to the graduate program in Curriculum and Instruction, Mathematics Education emphasis area. Admission will be based on a recommendation by the Mathematics Department in consultation with the Mathematics Education faculty in the Department of Curriculum and Instruction.

For the B.S./M.Ed. Degree in integrated Mathematics B.S. and Curriculum and Instruction M.Ed., 129 credits are required for the B.S. degree, 34-30 credits are required for the M.Ed., and 41 credits are required for field experiences and additional courses required for secondary mathematics certification in Pennsylvania. A maximum of 12 credits, at least half of which are at the 500-level, may be dual-counted toward the B.S. and M.Ed. The following courses can be used in both the B.S. and the M.Ed. degrees: two MATH 400-level electives, STAT 501, STAT 502. Students can complete the B.S. in Mathematics and not advance to the M.Ed. Curriculum and Instruction degree if they desire. Students who have been accepted into the IUG program but are unable to complete the M.Ed. in Curriculum and Instruction may be awarded the B.S. in Mathematics after having completed all degree requirements for the B.S. The M.Ed. requires one full year beyond the B.S., including student teaching in the graduate year.

Master of Education

CURRICULUM AND INSTRUCTION M.Ed. (34-30 credits)
(IUG in Mathematics/Curriculum and Instruction)

Core Areas (9 credits - choose one course from each area): Curriculum: CI 550 or equivalent; Research: STAT 500 or equivalent; Learning: EDPSY 421 or equivalent
Emphasis in Mathematics Education (* denotes required courses) includes *C I 590; *STAT 501; MATH 485, MATH 486, or MATH/CMPSC 451; *MTHED 511 or equivalent; *MTHED 524; at least one additional 400-level MATH course other than 401, 405, 406, 441, 470, or 471; at least one additional 400- or 500-level MTHED course.

Note: A Master's paper is required for completion of the M.Ed.

A passing score on the state-required Mathematics Content Exam is required for Mathematics Grades 7-12 certification.

[Proposed new text concerning the Mathematics IUG option ends here.]

[This final paragraph is in the existing Bulletin and should remain unchanged.]

Courses
Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

[End of Bulletin copy.]
Dr William Carlson  
Professor of Science Education  
Department of Curriculum and Instruction  

Nov. 9, 2012

Dear Professor Carlson,

There is a national call to address the shortage of quality science teachers and the proposed IUG between Biology, and Curriculum and Instruction, is a response to this call to action. The proposed coursework will enable students to work towards a BS in Biology and a MEd in Curriculum and Instruction (and a Pennsylvania Teaching credential) simultaneously and matriculate in 5 yrs. Given that sequential degrees often take 6 years, this is a significant time savings to students. The Biology Department enthusiastically supports this proposal and urges the Faculty Senate and the Graduate School to give this full consideration for a speedy acceptance.

Sincerely,

Dr. Doug Cavener  
Professor and Head  
Department of Biology
November 7, 2012

To whom it may concern:

The Chemistry Department enthusiastically supports this proposal for an Integrated Undergraduate/Graduate Study program between Chemistry and Curriculum and Instruction. Over the past decade it has been common for one or two Chemistry majors every year to decide to pursue careers in science education. Until now we’ve been advising such students in a rather ad hoc fashion, and it has typically resulted in these students requiring several extra semesters to complete the education components needed for the M. Ed. degree. This integrated program will help streamline the overall requirements for B. S. and M. Ed. degrees and provide students with a clearly defined path toward their educational goals. In addition, we anticipate that having this program in place will help attract more students into careers in science teaching, and help satisfy an urgent national need. We look forward to having this program in place as soon as possible.

Sincerely,

[Signature]

Barbara J. Garrison
Head, Department of Chemistry
Shapiro Professor of Chemistry
DATE: November 6, 2012

TO: Chair, Graduate Council Subcommittee on New and Revised Programs and Courses
    Chair, Senate Committee on Curricular Affairs

FROM: David H. Monk

RE: Integrated Undergraduate/Graduate Programs

I fully support the proposed Integrated Undergraduate/Graduate programs (IUGs) combining an undergraduate degree in Biology, Chemistry, or Mathematics and a Master's of Education from the Department of Curriculum and Instruction in the College of Education. In addition to these degrees, students enrolled in these programs will complete a secondary teacher certification allowing them to teach in public schools in Pennsylvania and many other states. These programs will provide unique opportunities for excellent science and mathematics undergraduates to enter the teaching profession. Our state and nation are currently facing a shortage of well-trained teachers in these areas. These programs will address this crucial need by recruiting students into secondary teaching. We have been working to develop programs that include strong subject matter preparation and meet all the requirements for teacher certification. Our faculty members in Curriculum and Instruction have worked closely with the Center for Excellence in Science Education at the Eberly College of Science. These programs are well aligned with the strategic interest the College of Education has in science and mathematics education. I am quite pleased with the proposed programs.
February 2, 2012

David Monk
College of Education
275 Chambers Building
University Park, PA 16802

Dear David:

I enthusiastically support the proposed integrated degree (IUG) programs providing students with a direct path to earn a bachelor's degree in Chemistry, Mathematics, and Biology and master's degree in education. These programs are in direct alignment with the science education initiatives supported by the degree programs in these disciplines, The Center for Excellence in Science Education, and the Eberly College of Science. We recognize the national need for outstanding STEM educators possessing both strong content and pedagogical knowledge and are deeply committed to encouraging our strongest students to pursue careers in science education. An IUG Program will provide a very attractive route to careers in science education and will also provide another tool for the recruitment of talented students who have made an early decision to pursue this goal to the Eberly College of Science. The Center for Excellence in Science Education is poised to shepherd the efforts of these IUG degree programs, and has been actively pursuing scholarship funds to assist students. The Eberly College of Science has the infrastructure, the programs both academic and outreach and the strong partnerships with the College of Education to build together outstanding IUG Programs for students pursuing careers in science education.

Sincerely,

Daniel J. Larson
Verne M. Willaman Dean

An Equal Opportunity University
The Mathematics Department supports this proposal for an IUG program in mathematics and mathematics education. It is increasingly common for students to inquire about blending mathematics and secondary education. This IUG provides a cohesive program that has the added benefit of enhancing students' statistical preparation in addition to our already strong preparation in mathematics and mathematics education.

The Mathematics Department has worked closely with our colleagues in the mathematics education program at Penn State to structure this program, and we fully support this initiative.

Sincerely,

Yuxi Zheng
Professor of Mathematics
Head of Department
Undergraduate Program Sample Description

This additional section is provided in case there are questions about how the program will be described to undergraduates. For economy's sake, we include only the Chemistry listing. The Biology listing is substantially very similar, although it obviously differs in the specifications of required science courses.

Note that new text appears below the current Bulletin listing, which is unchanged. Changes begin at the designation on p. 14, "New text follows."  *Chemistry*

*University Park, Eberly College of Science (CHEM)*

Professor Mark Maronecili, Assistant Head for Undergraduate Education

This major provides a strong foundation in the theory and practice of chemistry. Mathematics and physics are emphasized, since these subjects are essential to the understanding of chemistry. Courses in English and electives ensure study in non-technical subjects which broaden the student's general education and enables him or her to relate the major to other fields of knowledge.

In order to be eligible for entrance to the Chemistry major, a student must have: 1) Attained at least a 2.00 cumulative grade point average. 2) Completed CHEM 110 GN(3), CHEM 111 GN(1), CHEM 112 GN(3), CHEM 113 GN(1), CHEM 210(3), MATH 140 GQ(4), and MATH 141 GQ(4); earned a grade of C or better in each of these courses; and earned a combined grade point average of at least 2.50 in these courses. (Note: If courses are repeated, only the better grade will be used in this calculation.)

For the B.S. degree in Chemistry, a minimum of 125 credits is required.

*Scheduling Recommendation by Semester/Standing given like (Sem.: 1–2)*

**GENERAL EDUCATION:** 45 credits

(15 of these 45 credits are included in the REQUIREMENTS FOR THE MAJOR)

(See description of General Education in this bulletin.)

**FIRST YEAR SEMINAR:** 1-3 credits

**UNITED STATES CULTURES AND INTERNATIONAL CULTURES:**

(Included in GENERAL EDUCATION course selection)

**WRITING ACROSS THE CURRICULUM:**

(Included in REQUIREMENTS FOR THE MAJOR)

**REQUIREMENTS FOR THE MAJOR:** 94 credits

(This requirement includes 15 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses.)

**PRESCRIBED COURSES (54 credits):**

CHEM 110 GN(3)[H], CHEM 111 GN(1)[H], CHEM 112 GN(3)[H], CHEM 113 GN(1)[H], MATH 140 GQ(4)[H], MATH 141 GQ(4)[H] (Sem.: 1–2)

PHYS 211 GN(4), PHYS 212 GN(4), PHYS 213 GN(2), PHYS 214 GN(2) (Sem.: 1–4)

MATH 221(2) (Sem.: 3–4)

CHEM 210(3)[H], CHEM 212(3)[H], CHEM 213(2)[H], CHEM 227(4)[H], CHEM 310(3)[H], CHEM 316(1), CHEM 450(3)[H], CHEM 452(3)[H], CHEM 457(2), http://bulletins.psu.edu/bulletins/bluebook/college_campus_details.cfm?id=35&program=chem.html

**ADDITIONAL COURSES (23 credits):**

Select 3 credits from MATH 250(3) or STAT 401(3) (Sem.: 5–8)

Select 4 credits from advanced laboratory courses: CHEM 423W(4)[H], CHEM 431W(4)[H], CHEM 459W(4)[H] (Sem.: 5–8)

Select 16 credits of chemistry at the 400 level. Up to 6 co-op credits (2 each of SC 295, SC 395, SC 495)
may be used in this category. Chemical Research, CHEM 494 (1-10) may be used, but the total of CHEM 494 credits plus co-op credits may not exceed 8. (Sem: 5-8)

**SUPPORTING COURSES AND RELATED AREAS** (17 credits)
These 17 credits may include any courses not on the Chemistry Department list of excluded courses except that CHEM 494 may not be used, and only one credit of each SC 295, SC 395, and SC 495 is allowed in this category. (Sem: 1-8)

I A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2010
Blue Sheet Item #: 38-04-088
Review Date: 01/12/2010
UCA Revision #: 1: 8/3/06
SG

<New text follows>

**Integrated B.S. in Chemistry — M.Ed. in Curriculum and Instruction**

The Integrated Undergraduate/Graduate (IUG) degree program combines the Bachelor of Science in Chemistry with the Master of Education in Curriculum and Instruction (Science Education emphasis). The program is designed to be completed in five years. The degree enables highly qualified and motivated students to delve deeply into the content areas of chemistry and science education and to earn teaching credentials. The chemistry degree ensures that students graduating from the program will be recognized by school districts as having achieved depth of understanding in an important science discipline. The master’s degree in education provides students with graduate-level preparation in the theory and practice of teaching, while completing accreditation requirements for licensure to teach in Pennsylvania.

**Application Process**

This program has a small number of spaces available each year and enrollment is limited to students with superior academic credentials and a demonstrated commitment and ability in teaching. Applicants must be enrolled in the Eberly College of Science, with a GPA of 3.4 or higher, having earned 60-100 credits toward Chemistry major requirements. Application materials to be provided by applicants:

- A transcript and statement of purpose
- A plan of study that has been approved by both a faculty advisor in the Department of Chemistry and a member of the Graduate Faculty in Curriculum and Instruction (Science Education emphasis area)
- Two letters of recommendation, from faculty or staff members in education outreach programs in which the student has participated during his or her first four semesters
- Submission of an application for master’s study to the graduate program in Curriculum and Instruction, Science Education emphasis area

**Degree Requirements**

IUG students fulfill all degree requirements for a B.S. in Chemistry. If a student chooses to leave the program without completing M.Ed. requirements, he or she may still receive the B.S. degree in Chemistry, after the initial four years of study.

For the M.Ed. degree, students must earn at least 30 credits at the 400/500 level, at least 18 of them at the 500 level. One graduate semester is devoted to full-time student teaching. Additional graduate coursework
is completed in a second graduate semester. Courses required for the M.Ed. degree include SCIED 552(3), SCIED 558(3), a 500-level EDTHP course (3), C I 590(1), C I 595(12), and a 500-level course in curriculum (e.g., C I 550(3)). Of these, SCIED 558(3) and C I 595(12) comprise the student teaching semester course load. Substitutions for some courses are possible, with the approval of a student's SCIED advisor.

124 credits are required for the B.S. degree and 30 credits for the M.Ed. degree. The following courses may be double-counted toward both the B.S. and the M.Ed. degrees, up to a limit of 12 credits: EDTHP 500-level courses (3), SCIED 411(3) & SCIED 412(3), and SCIED 500-level courses. Note that at least 50% of credits proposed for double-counting must be at the 500 level.

There are a number of other requirements for Pennsylvania teacher certification, including state-required tests and clearances, as well as coursework that can be completed at either the undergraduate or graduate level. Some courses, not enumerated above, that are usually required to satisfy teacher certification requirements include C I 280(3), SPLED 400(3), and C I 495C(3). Please note that changes in Pennsylvania certification requirements are common; students should check the Certification FAQ page at the Penn State Science Education website for updates and clarification about the specific requirements that affect them, based on their admission date to the IUG program option. Note also that students in the IUG program option are not required to complete all Penn State teacher certification requirements in order to receive their B.S. and M.Ed. degrees, as long as they have completed the requirements for those degrees, as described in the undergraduate and graduate Bulletins. For example, a student who has completed all degree requirements but has not yet received a score for the Pennsylvania required Chemistry content exam may be awarded both of his or her earned degrees.

<End of proposed Undergraduate Bulletin copy>
Graduate Council
Program, Option, or Minor Proposal Form

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Curriculum Coordinator, University Faculty Senate, 101 Kern Graduate Building, University Park. The proposals will be transmitted to the Office of the Dean of the Graduate School for entry into the Graduate Council curricular review process; for more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

College/School: College of Engineering
Department or Instructional Area: Department of Architectural Engineering

New Graduate Program, Option, or Minor: □ Add
Designation of new graduate program: M.Eng. in Facilities Engineering and Management
Classification of Instructional Programs (CIP) Code: 14
Designation of new graduate option: ____________________________
Designation of new graduate minor: ____________________________

Indicate effective semester:
□ First semester following approval
□ Second semester following approval

Existing Graduate Program Option, or Minor: □ Change □ Drop
Current designation of graduate program: ____________________________
Current designation of graduate option: ____________________________
Current designation of graduate minor: ____________________________

New designation of existing graduate program (if changing): ____________________________
New designation of existing graduate option (if changing): ____________________________
New designation of existing graduate minor (if changing): ____________________________

Brief description of the change (if not noted above): ____________________________

Indicate effective semester:
□ First semester following approval
□ Second semester following approval

Submitted by Graduate Program Head
Dr. Chinmay Anumba
Printed name
Signature
Date: APR 14, 2015

Noted by College/School Representative to Graduate Council Subcommittee on New and Revised Programs and Courses:
CM Harmonesky
Printed name
Signature
Date: 4/15/15

Approved by College/School Dean/Chancellor (or Designee):
Lee D. Corcoran
Printed name
Signature
Date: 4/16/15
Recommended by Chair, Graduate Council Subcommittee on New and Revised Programs and Courses:

On Behalf of Luis Ayala
Printed name
Signature
Date: 10/14/2015

Recommended by Chair, Graduate Council Committee on Programs and Courses:

On Behalf of Andris Freivalds
Printed name
Signature
Date: 10/14/2015

Noted by Dean of the Graduate School:

On Behalf of Regina Vasilatos-Younken
Printed name
Signature
Date: 10/14/2015
Facilities Engineering and Management

Graduate Degree Program Proposal, offering the M.Eng.

College of Engineering
Department of Architectural Engineering

Contact:
Dr. Chimay Anumba
Anumba@engr.psu.edu
X32091
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Introductory Narrative

This proposal seeks to establish a new 1-year Master of Engineering in Facilities Engineering and Management, which is intended to prepare a new generation of professionals in the field of facilities management. The program will address the critical need for professionals with relevant expertise in the management of facilities – from individual buildings to campus-wide physical plant or a distributed portfolio of facilities. While the Architectural Engineering Program adequately prepares its graduates to be effective designers and builders of high performance constructed facilities, it has not had a dedicated facilities engineering and management program. The growth in sophistication of built facilities due to the changing expectations for environmental stewardship and sustainability, energy management, automated controls, regulatory compliance, emergency preparedness and business continuity, indoor environmental quality, operations and maintenance, and financial management, makes it imperative to develop a new program in this field. Buildings and associated facilities are now more complex than ever and need to be managed by competent professionals.

The environment in which facilities engineering and management takes place is also evolving – there is more technology, a greater focus on sustainability and energy issues, increased occupant sensitivity, shrinking budgets, and increasing regulatory requirements. Professionals need to be well prepared to meet the challenges of modern facilities engineering and management. There are also minimal similar programs on the east coast of the US; although a few certificate and graduate programs are now springing up, they are being offered by institutions without the expertise and reputation of Penn State’s AE Program.

A 2008 research analysis by the International Facilities Management Association (IFMA) found that 10,000 facility managers are needed nationally per year, with 2,000 being needed in the Mid-Atlantic region alone. These figures have not changed significantly since the initial study. Nationally, there are only three facilities management master’s degree programs that are accredited by IFMA. The profession is poorly served with regard to higher education and is in need of more focused training and education. IFMA has identified 11 competency areas to ensure that the facility management body of knowledge encompasses current knowledge, best practices, and trends in facilities management. These have been integral to guiding the fundamentals of this M.Eng. program.

The Facilities Engineering and Management program is proposed by the Department of Architectural Engineering with support and input from Penn State’s Facility Engineering Institute (FEI) and the Office of the Physical Plant (OPP).
A. Graduate Bulletin Copy

Facilities Engineering and Management

Program Chair
Chimay J. Anumba
Department Head, Department of Architectural Engineering
104 Engineering Unit A
University Park, PA 16802
814-865-6395
anumba@engr.psu.edu

Degree Conferred
M.Eng.

The Graduate Faculty

Chimay J. Anumba, Ph.D., D.Sc. (UNIVERSITY OF LEEDS), Department Head and Professor

Somayeh Asadi, Ph.D. (LOUISIANA STATE UNIVERSITY AND A&M COLL), Assistant Professor of Architectural Engineering

William P. Bahnfleth, Ph.D. (UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN), Professor of Architectural Engineering

Thomas E. Boothby, Ph.D. (UNIVERSITY OF WASHINGTON), Professor of Architectural Engineering

James D. Freihaut, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Professor of Architectural Engineering

Linda M. Hanagan, Ph.D. (VIRGINIA POLYTECHNIC INSTITUTE AND STATE), Associate Professor of Architectural Engineering

Kevin W. Houser, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Professor

Robert M. Leicht, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Assistant Professor of Architectural Engineering

Ali M. Memari, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Professor of Architectural Engineering

John I. Messner, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Professor of Architectural Engineering

Richard G. Mistrick, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Associate Professor of Architectural Engineering
M. Kevin Parfiit, M.Eng. (CORNELL UNIVERSITY), Professor of Architectural Engineering

David R. Riley, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Associate Professor of Architectural Engineering

Donghyun Rim, Ph.D., Assistant Professor of Architectural Engineering

Aly Said, Ph.D. (UNIVERSITY OF WESTERN ONTARIO), Associate Professor of Architectural Engineering

Jelena Srebric, Ph.D. (MASSACHUSETTS INSTITUTE OF TECHNOLOGY), Adjunct Professor of Mechanical Engineering; Professor of Architectural Engineering

Susan W. Stewart, Ph.D. (GEORGIA INSTITUTE OF TECHNOLOGY), Research Associate

Stephen Treado, Ph.D. (UNIVERSITY OF MARYLAND COLLEGE PARK), Associate Professor

Michelle Vigeant, Ph.D. (UNIVERSITY OF NEBRASKA, LINCOLN), Assistant Professor of Acoustics and Architectural Engineering

Program Description

The Facilities Engineering and Management Masters of Engineering is a master’s degree program designed to prepare professionals in the field of facilities management. The program is designed to address the critical need for professionals with relevant expertise in facilities management. The curriculum consists of 30 credits, delivered in residence. It provides broad coverage of topics related to facilities management while providing in-depth coverage of elective topics of the students choosing. Students will take a number of core program courses that provide an in-depth understanding of the role of facilities engineer and facilities manager. A capstone project will be required of all students which will serve to combine the material learned and provide a cumulative educational experience within a semester long project.

Admission Requirements

Educational Background

For admission, an applicant must hold either (1) a bachelor’s degree from a U.S. regionally accredited institution with an architectural engineering degree or other cognate discipline or (2) bachelor’s degree in an unrelated field with significant experience in facilities management or (3) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Applications must include a statement of purpose, a curriculum vita or resume, and three letters of recommendation. Official records of scores on the Graduate Record Exam (GRE) are also required. In special circumstances, a student may be admitted at the discretion of the program for graduate study without these scores. The department has no established minimum GRE score for applicants.
Language of Instruction
The language of instruction at Penn State is English. International applicants must take and officially submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5. Graduate programs may have more stringent requirements. Please see the Graduate School English Profiency requirements for additional information.

Core Application Packet
- Statement of Purpose – A statement of professional experience and goals (up to 500 words)
- Vita or resume
- Three letters of recommendations
- Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) score, if applicable
- Application fee

Admissions Process
Applications will be evaluated by the Facilities Engineering and Management admission committee based on the applicants’ technical qualifications for the program relative to their previous educational and professional experience and English language proficiency. In general, successful applicants are expected to have earned a GPA of at least 3.0 on a 4.0 scale. The candidate must apply to the program via the Graduate School application for admission.

Master’s Degree Requirements
The Facilities Engineering and Management degree is conferred upon students who earn a minimum of 30 graduate credits, of which 20 must be earned at the campus/center where the degree program is offered, while maintaining an average grade-point average of 3.0 or better in all course work, including at least 18 credits in graduate courses (500 series), and who complete a quality culminating capstone project in consultation with a graduate advisor. The program curriculum includes 15 credits of core courses, 12 credits of electives, and a 3-credit capstone project.

Required courses
Prescribed courses for the degree include 18 credits of core courses:

- *AE 881 Effective Facility Management and Planning (3 cr.)
- *AE 880 Facilities Energy Management (3 cr.)
- *AE 581 Facilities Management Information Systems (3 cr.)
- AE 531/598D Legal Aspects in Engineering and Construction (3 cr.)
• AE 572 Project Development and Delivery Planning (3 cr.)
• AE 596 Capstone Course (3 cr.)

*denotes new course

Elective Courses
A list of elective courses can be found on the department’s website - http://www.engr.psu.edu/ae/courses/graduate.asp.

Substitutions
Substitutions for the above prescribed courses, either with resident-education courses, alternate online courses, or courses from other institutions, will be considered on a case-by-case basis, and must be petitioned and approved by the Academic Program Chair, with input from the student’s advisor.

Student Aid
Student financial aid opportunities are available through the Office of Student Aid - http://studentaid.psu.edu/. Students on graduate assistantships must adhere to the course load policy listed in the Bulletin - http://www.gradschool.psu.edu/graduate-funding/infoga/.

Courses
Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

B. Justification for the program

Program Statement
There is an industry need for a professional master's program in facilities engineering and management. Building and associated facilities are now more complex than ever and need to be managed by competent professionals. The environment in which facility engineering and management take place is also changing – there is more technology, a greater focus on sustainability and energy issues, shrinking budgets, and increasing regulatory requirements. Professionals need to be brought up to speed on the ever evolving field of facilities engineering and management. A 2008 research analysis by the International Facilities Management Association (IFMA) found that 10,000 facility managers are needed nationally per year, with 2,000 being needed in the Mid-Atlantic region alone. Nationally, there are only three facility management master's degree programs that are accredited by IFMA. The profession is poorly served with regard to higher education and is in need of more focused training and education.
In 2010, the U.S. enacted the Federal Buildings Personnel Training Act (FBPTA) to facilitate the development and maintenance of a high performance federal buildings workforce. The idea behind the Act is that a building properly maintained by trained and educated facilities management professionals will perform better and at lower costs. Also, in 2011, President Obama announced the Better Buildings Initiative, and more specifically the Better Buildings Workforce Guidelines, to improve operational performance and make commercial and industrial buildings 20% more energy efficient over the next 10 years. Building and associated facilities are now more complex than ever and need to be managed by competent professionals.

**Ability of the department to offer a quality program**

This program fits well with the Department of Architectural Engineering’s mission to provide leadership in the built environment field. The scope of the department’s teaching, research and service efforts includes: designing all building systems on the principles of safety and serviceability and creating high quality, healthy, safe, energy efficient, and productive indoor environments. The four options within the Architectural Engineering major cover the design and construction of buildings. There is a strong need for education on the operation and maintenance of buildings in order to maintain the high quality, safe, energy efficient, and productive environment created. The proposed MEng program in Facilities Engineering and Management will close this loop. With the Department being the premier AE program in the country/world and having a strong alumni base, it is well-placed to attract students to the program. The involvement of the Facilities Engineering Institute (FEI) and the Office of Physical Plant (OPP) are also considered vital in attracting students from the Pennsylvania Department for General Services (DGS), the Federal General Services Administration (GSA), current OPP employees, and others to the FEM program.

**Projected Program Size**

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Enrollment</td>
<td>15</td>
<td>25</td>
<td>40</td>
</tr>
</tbody>
</table>

**Impact on current course offerings and faculty load**

Three new courses are needed to enable the new program to run, with many existing courses being used to meet required and elective course provisions. It is intended that these new courses will be staffed by fixed-term faculty, with support from regular faculty. The increased enrollment in existing courses is not expected to significantly increase faculty load. The opportunities offered by the new program could also be useful in attracting new graduate and undergraduate students to the Department.
Additional faculty advising duties

Architectural Engineering Graduate Faculty will be expected to advise students in the program, relative to their involvement in the program. Student advising duties will consist, at a minimum, of a meeting with each student to review his/her progress and plans, provision of guidance and approval of course selection, guidance and approval of a capstone project, and referral to resources for assistance with any issues that are preventing the student from reaching his/her full potential.

C: Objectives of the Program

Program Objectives

The overall objective is to educate the next generation of facility engineers and managers who will be competent in the operation and maintenance of complex physical plant and other constructed facilities.

At the end of this program, students should be able to:

- Understand critical issues in facility planning and management;
- Understand the integrated sub-systems in a building and the position of a building as a more complex eco-system of facilities;
- Apply appropriate energy management and sustainability concepts in managing facilities;
- Understand the legal and contractual context in facilities engineering and management;
- Be proactive in ensuring effective health and safety management practices in facilities management;
- Effectively manage the process for the design, construction, and delivery of new facilities.

How the program strengthens the existing programs of the college and university

This program is consistent with the strategic goal of the College of Engineering (COE) to produce world-class engineers for industries that require significant engineering contribution. The facilities engineering and management industry is certainly one such industry that, with the introduction of well-educated professionals, will greatly improve the efficiency of the delivery, operation and maintenance of constructed facilities. The courses offered in the program support the COE goal of enhancing the graduate engineering curriculum, and place an emphasis on effective facilities management planning, benchmarking, information systems, and energy management/sustainability. Offering this program will also allow Penn State to be recognized as one of the best schools in the country with a strong focus on the facilities engineering and management field and which has a structured program that introduces these graduates to careers in the industry.
Expected student accomplishments

Students will attain competence in key areas, as outlined in the program objectives listed above. After completing the master’s program, students will be able to perform as facilities engineers and facilities managers even if they have received their bachelor degrees in an area other than Facilities Engineering and Management.

Non-duplication of other degree programs

This program does not duplicate other degree programs within the university.

D: New courses to be established as part of the new program

AE 581 Facilities Management Information Systems (3 cr.)
AE 880 Facilities Energy Management (3 cr.)
AE 881 Effective Facilities Management and Planning (3 cr.)

Required courses

Prescribed courses for the degree include 18 credits of core courses:

- *AE 881 Effective Facility Management and Planning (3 cr.)
- *AE 880 Facilities Energy Management (3 cr.)
- *AE 581 Facilities Management Information Systems (3 cr.)
- AE 531/598D Legal Aspects in Engineering and Construction (3 cr.)
- AE 572 Project Development and Delivery Planning (3 cr.)
- AE 596 Capstone Course (3 cr.)

Additional Courses

12 credits must be selected from the following list of courses:

- AE 461 Architectural Illumination Systems and Design (3 cr.)
- AE 464 Advanced Architectural Illumination Systems and Design (3 cr.)
- AE 469 Solar PV Design and Construction (3 cr.)
- AE 473 Building Construction Management and Control (3 cr.)
- AE 497E Building Electrical and Communication Systems (3 cr.)
- AE 537 Building Performance Failures and Forensic Techniques (3 cr.)
- AE 543 Research Methods (3 cr.)
- AE 542 Building Enclosure Science & Design (3 cr.)
- AE 552 Air Quality in Buildings (3 cr.)
- AE 557 Centralized Cooling Production and Distribution Systems (3 cr.)
- AE 558 Centralized Heating Production and Distribution Systems (3 cr.)
- AE 565 Daylighting (3 cr.)
- AE 570 Production Management in Construction (3 cr.)
- AE 597F Virtual Facility Prototyping (3 cr.)
- AE 597G Building Information Modeling Execution Planning (3 cr.)
- AE 598 Sustainable Building Project Management (3 cr.)
• AE 862 Distributed Energy Planning and Management (3 cr.)
• IE 555 Statistical Process Monitoring and Analysis (3 cr.)
• IE 419 Work Design – Productivity and Safety (3 cr.)
• REST 560 Real Estate Financial Analysis (2 cr.)
• REST 570 Institutional Real Estate Investment (2 cr.)
• HRER 505 Seminar in Human Resources (3 cr.)

E. Program title justification

The Master of Engineering degree title will be used for this program as the program is intended to emphasize practical application of knowledge and is intended to further the professional development and advancement of Facility Managers and Facility Engineers.

G. Accreditation

Statement of accreditation or licensure

The International Facility Management Association (IFMA) and the IFMA Foundation have sponsored the development of the Facilities Management Accreditation Commission (FMAC). Accreditation at the professional level of education is directed toward those programs that provide academic preparation for the professional facility manager. This preparation is the first component of a recommended sequence including formal education, entry-level experience, and satisfactory completion of professional certification examination(s). Compliance with FMAC Standards can occur in a variety of academic settings an FM program seeking accreditation must provide evidence and demonstrate that:

a) The institution is accredited and recognized by other accrediting organizations
b) The program culminates at a minimum of an associate’s degree.
c) The program follows the graduation requirements of the institution, has an FM program that has been approved by the institution, has a Facility Management Advisory Committee, and demonstrates that it follows the FMAC Guidelines for an Accredited Degree Program.
d) A minimum of two cohort classes have graduated from the program prior to submission of the application, or demonstration that the program has started within the institution and has admitted students.
e) The majority of student work displayed as evidence of student achievement shall be produced from the current curriculum.
f) Program outcomes are assessed based on an on-going curriculum that has produced a body of work for review, taken from no longer than the preceding 5 years, or since the previous accreditation cycle.

The AE Department is working in collaboration with IFMA to ensure that the design of the program enables graduates of the program to proceed to full certification as Facilities Management Professionals.
H. Consultation

Consultation was sought from the following:

Department of Mechanical Engineering
Department of Civil and Environmental Engineering
Department of Electrical Engineering
Department of Industrial and Manufacturing Engineering
Department of Energy and Mineral Engineering
Smeal College of Business
School of Labor and Employment Relations
Penn State Harrisburg – School of Science, Engineering, and Technology
Penn State Erie – The Behrend College – School of Engineering

The responses below were received by March 16, 2015 to the following request that was sent on February 28, 2015:

Dear Department Heads and Program Coordinators,

As part of our continuing effort to enhance the College of Engineering’s graduate programs, the Department of Architectural Engineering, with input from the Office of the Physical Plant and Penn State’s Facilities Engineering Institute, has developed a proposal for a Facilities Engineering and Management MS degree program. The College of Engineering has recommended that we submit the attached proposal for your review. The proposal has already been reviewed and received the support of the Graduate Studies Committee of the Department of Architectural Engineering. Please consider this a formal consultation request and let me know if you are supportive, as well as your comments and concerns. I would appreciate if you could respond by Friday, March 13th. If I do not receive a response by that time I will assume there is no objection.

Department of Mechanical/ Nuclear Engineering

From: Karen Thole
Sent: Saturday, February 28, 2015 1:06 PM
To: Chimay J. Anumba
Subject: Fwd: Facilities Engineering and Management proposal

Chimay

MNE is supportive.

Karen
Hi Chimay,

I have consulted our real estate faculty and department chair. We are fine with the proposal.

All the Best,

Jeff

Kultegin Aydin
Professor and Department Head
Department of Electrical Engineering
The Pennsylvania State University
129 EE East, University Park, PA 16802
(814)863-2788 Fax: (814)865-6392

Suggestions:
1. There is reference to “statement of professional goals” on page 5. The Graduate School uses "Statement of Purpose" as done on page 6. The same term could be used for consistency.
2. On page 7 a link to the departmental website on elective courses might be helpful.
Penn State Harrisburg – School of Science, Engineering, and Technology

From: R. BACHNAK [mailto:rab65@psu.edu]
Sent: Saturday, March 07, 2015 11:12 AM
To: Richelle B. Weiger
Subject: Re: Facilities Engineering and Management proposal

Dear Chimay,

We don't have any concerns about this proposal. Good luck with the next steps.

R. Bachnak

Department of Industrial and Manufacturing Engineering

From: Harriet B. Nembhard
Sent: Thursday, March 12, 2015 10:54 AM
To: Richelle B. Weiger
Cc: Chimay J. Anumba
Subject: Re: Facilities Engineering and Management proposal

I responded on the course proposal management system and thought that completed the task. I have no objections.

Harriet

School of Labor and Employment Relations

From: PAUL CLARK [mailto:pfc2@psu.edu]
Sent: Friday, March 13, 2015 12:12 AM
To: Richelle B. Weiger
Subject: Re: Facilities Engineering and Management proposal

Richelle,

I am sure I look at this degree program differently than engineers, but it seems quite possible that a student could finish this program, ostensibly prepared to be a Facilities Manager, without having learned or thought much about the human element involved in this kind of role. The degree addresses Facilities Management, in addition to Facilities Engineering. I assume that a person engaged in management of a facility would have responsibility for employees of that facility, yet the degree would give them no background in managing employees. I would think that at least one course for such a degree should deal in an intensive way with this issue. I see that our School's HRER 505--Grad Seminar in Human Resources is included in the elective list. However, with 21 other courses on the list, I would think that few, if any, of the students in the program would be likely to take it. Would it make sense to
require this course?
Paul

Paul F. Clark, Professor and Director

School of Labor and Employment
Relations
Penn State
University
5th Floor, Keller Bldg.
University Park, PA 16802
Ph. 814-865-0752

Response:

From: Richelle B. Weiger
Sent: Monday, March 16, 2015 8:28 AM
To: 'PAUL CLARK'
Subject: RE: Facilities Engineering and Management proposal

Hi Paul,

Thank you for your response. The required AE 881 Effective Facility Management and Planning course includes some HR content. As you have seen, we also included HRER 505 as an elective for those students who have more HR management responsibilities; with scope to make it a required course in the future, if deemed necessary.

Thanks,
Richelle

Department of Energy and Mineral Engineering

From: Turgay Ertekin [mailto:eur@psu.edu]
Sent: Sunday, March 15, 2015 7:00 PM
To: Richelle B. Weiger
Subject: RE: Facilities Engineering and Management proposal

Dear Professor and Head Chimay Anumba,

I have had the opportunity to review the document containing the proposed non-thesis one-year M.S. degree graduate program in Facilities Engineering and Management. I am pleased to report that Department of Energy and Mineral Engineering does not have any objections to the proposed program as we believe that the proposed program is addressing an area which is much needed by the industry and society at large.

All the best,
Turgay Ertekin
Head, John and Willie Leone Family
Department of Energy and Mineral Engineering
George E. Trimble Chair in Earth and Mineral Sciences
Professor, Petroleum and Natural Gas Engineering

P.S. I apologize that I could not get back to you on a timely fashion because of my other commitments. I hope that you will still be able to entertain my formal response in the final submission stage of the proposal.

The following email was sent on Tuesday, April 14 in regards to a degree title change:

From: Richelle B. Weiger
Sent: Tuesday, April 14, 2015 11:14 AM
To: 'eur@psu.edu'; 'kthole@psu.edu'; 'paj6@psu.edu'; 'aqx@psu.edu'; 'hbn2@psu.edu';
'jeffsharp@psu.edu'; 'rab65@psu.edu'; 'rmf7@psu.edu'
Subject: RE: Facilities Engineering and Management proposal

All,

The Department of Architectural Engineering recently put forth a proposal for a MS in Facilities Engineering and Management which was sent to you for consultation and your subsequent approval. We received feedback from the College of Engineering that the program would be better suited as an MEng degree and have made that degree title change. Please respond to me by the end of today if you have any comments or issues with this change.

Thank you,
Richelle

Responses:

Department of Civil and Environmental Engineering
From: Peggy Johnson
Sent: Tuesday, April 14, 2015 12:02 PM
To: Richelle B. Weiger
Subject: Re: Facilities Engineering and Management proposal

Fine with me.

Peggy Johnson
Head and Professor
Civil and Environmental Engineering
212 Sackett Building
Penn State University
University Park, PA
Department of Mechanical and Nuclear Engineering

From: Karen Thole
Sent: Tuesday, April 14, 2015 1:28 PM
To: Richelle B. Weiger
Subject: RE: Facilities Engineering and Management proposal

No comments from MNE.

________________________________________________
Karen A. Thole, Professor and Department Head
Department of Mechanical and Nuclear Engineering
The Pennsylvania State University
136 Reber Building, University Park, PA 16802-1412
(814)865-2519  FAX (814)865-1280
kthole@psu.edu  www.mne.psu.edu

Department of Electrical Engineering

From: Kultegin Aydin
Sent: Tuesday, April 14, 2015 3:18 PM
To: Richelle B. Weiger; eur@psu.edu; kthole@psu.edu; PEGGY JOHNSON; KULTEGIN AYDIN; HARRIET NEMBHARD; jeffsharp@psu.edu; rab65@psu.edu; rmf7@psu.edu
Subject: RE: Facilities Engineering and Management proposal

I have no comments or issues with this change.
Kultegin Aydin

Department of Energy and Mineral Engineering

From: Turgay Ertekin [mailto:eur@psu.edu]
Sent: Tuesday, April 14, 2015 6:32 PM
To: Richelle B. Weiger
Subject: RE: Facilities Engineering and Management proposal

Dear Richelle,
Energy and Mineral Engineering Department does not have any concerns with the suggested change.
Turgay Ertekin
Graduate Council Subcommittee On New And Revised Programs And Courses

COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member Proposing Course: Chimay Anumba

College: ENGINEERING

Department or Instructional Area: ARCHITECTURAL ENGINEERING

Type of Proposal: [✓] Add  [ ] Change  [ ] Drop

Type of Review: [✓] Full  [ ] Expedited

(See Guide to Curricular Procedure for definitions of a full or expedited review.)

Course Designation: (A E 880) Facility Energy Management

Proposed Bulletin Listing

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Number</th>
<th>Title</th>
<th>Abbreviated Title</th>
<th>Credits</th>
<th>Repeatable</th>
<th>Description</th>
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<tbody>
<tr>
<td>A E</td>
<td>880</td>
<td>Facility Energy Management</td>
<td>Energy Mgmt</td>
<td>Min: 3 Max: 3</td>
<td>No</td>
<td>Course examines fundamentals of energy supply, use, and management related to the operation of buildings.</td>
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</tbody>
</table>

Prerequisites:
Concurrent Courses:
Cross Listings:
Does this Course have a Travel Component: No

Course Outline

A brief outline or overview of the course content

Energy Fundamentals
Energy Markets and Procurement
Building Energy Sustainability
Energy Utilization in Facilities and Equipment
Energy Efficiency: Technologies, Systems, and Occupants
Energy Management Systems

A listing of the major topics to be covered with an approximate length of time allotted for their discussion

A. Energy Fundamentals (10)
   a. Key concepts
   b. Energy sources and alternatives
   c. Energy economics
B. Energy Markets and Procurement (5)
   a. Electricity
   b. Natural Gas
   c. Renewables
C. Building Energy Sustainability (10)
   a. Holistic building design approaches
   b. Building envelopes and energy conservation
   c. Water conservation
   d. Energy conservation measures
D. Energy Utilization in Facilities and Equipment (5)
   a. Electrical equipment
   b. Mechanical equipment
   c. Combustion equipment
   d. Lighting
   e. Controls
E. Energy Efficiency: Technologies, Systems and Occupants (10)
   a. Key concepts
   b. Materials
   c. Systems and their application
   d. Occupant behavior
F. Energy Management Systems (5)
   a. Control Systems
   b. Installation
   c. Commissioning
   d. Operations and maintenance
   e. Systems integration in smart buildings

Long Course Description:
A succinct stand-alone course description (up to 400 words) to be made available to students through the on-line Bulletin and Schedule of Courses.
This course focuses on the fundamentals of energy supply, use, and management as related to the operation of buildings with a particular focus on large commercial and institutional facilities. This content of this course is intended to build upon systems and design courses of building systems in architectural engineering and architecture to provide students with an interdisciplinary and integrative perspective of energy systems and energy management in buildings that is required for practicing facility management professionals. Students will learn to understand various energy sources, analyze occupant impact on energy use, examine structure of energy production and delivery and understand energy control systems and their effectiveness. Students will be evaluated on their comprehension of the course through class participation, homework, and exam. This course will be required by all MS degree students in the Facilities Engineering and Management program.

The name(s) of the faculty member(s) responsible for the development of the course
Dr. Chimay Anumba, Department Head, Department of Architectural Engineering

Justification Statement
Instructional, Educational, and Course Objectives
The primary educational goal of this course is to develop practical knowledge of energy management that is essential to working in the facility engineering management, operations, planning, or design field.

Upon completion of this course students will be able to:
- Define terms and establish common energy management language
- Understand various energy sources, their costs, values, and how they are used in society
- Analyze occupant impact on energy use
- Examine structure of energy production and delivery
- Understand the use of energy in buildings
- Analyze higher efficiency technologies and equipment
- Understand the role of building envelope and water conservation systems in energy conservation and management
- Understand energy control systems and their effectiveness
Evaluation Methods

Quantitative assessments of graded work will be used to develop grades using the current standard university scale of evaluation. AE 880 will rely upon a variety of methods to assess and evaluate student learning, including:

a. Students will be evaluated on their ability to comprehend and understand materials presented in class and in readings through the accurate and appropriate use of terminology in written discussion questions – 30%.

b. Exercises discussed in lectures will be extended into homework assignments. The accuracy of each student’s submissions will help assess the level of understanding of the topics covered – 30%.

c. Exams where students demonstrate effective understanding of the subject matter-40%.

Relationship/Linkage of Course to Other Courses

AE 880 is proposed at the graduate (800) level because it emphasizes student activities that require higher-order learning, especially in the analysis and evaluation of energy management issues in a built environment. This course is proposed at the 800 level because it builds on undergraduate knowledge of the field which aligns with the definition of an 800 level course.

There are no prerequisite courses for AE 880, however a working knowledge of the design and/or construction industry and a general understanding of the operation and maintenance of a building are strongly encouraged. Students in the MS in Facilities Engineering and Management are expected to be of graduate standing or have an undergraduate degree in a cognate discipline. This course complements the other courses in the Facilities Engineering and Management program.

Relationship of Course to Major, Option, Minor, or General Education

AE 880 is a required course in the Facilities Engineering and Management master’s degree program in the Department of Architectural Engineering. AE 880 may be applied to other Graduate Degree programs in Architectural Engineering with permission of students’ graduate program adviser.

A description of any special facilities

Frequency of Offering and Enrollment

AE 880 will be offered at least once annually, during the Fall semester. Additional offerings during the Spring or Summer sessions may be added to accommodate enrollment demands. It is expected to attract 15-20 students per offering.

Effective Date: Fall 2015

Consultation Summary/Response:

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<th>Symbol</th>
<th>Description</th>
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<td>Review Order</td>
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Formal Consultation

Name: Karen Thole

Department: MECHANICAL ENGINEERING
Concur: Yes
Comments: The EME Department is pleased to give its full consent on the proposed course. I expect that students who are specializing in Energy Engineering will have interest in A E 880 Facility Energy Management course.
Reviewed On: 3/1/2015 2:41:00 PM
Respond To Comments

Concur: Yes
Comments: The EME Department is pleased to give its full consent on the proposed course. I expect that students who are specializing in Energy Engineering will have interest in A E 880 Facility Energy Management course.
Reviewed On: 3/1/2015 2:41:00 PM
Respond To Comments

Concur: Yes
Comments: The EME Department is pleased to give its full consent on the proposed course. I expect that students who are specializing in Energy Engineering will have interest in A E 880 Facility Energy Management course.
Reviewed On: 3/1/2015 2:41:00 PM
Respond To Comments

Concur: Yes
Comments: The EME Department is pleased to give its full consent on the proposed course. I expect that students who are specializing in Energy Engineering will have interest in A E 880 Facility Energy Management course.
Reviewed On: 3/1/2015 2:41:00 PM
Respond To Comments

Required Signatories

Name: Chimay Anumba
Position: Department or Program Head
Title: DEPT HEAD/PROF AE
Department: ARCHITECTURAL ENGINEERING
Campus: UNIVERSITY PARK CAMPUS
<table>
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<th>Name</th>
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<td>Lee Coraor</td>
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<td>College Representative</td>
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<td>(Not Available)</td>
<td>Dean of the Graduate School</td>
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<td>Graduate Council Subcommittee</td>
<td>(Not Available)</td>
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<td>[Name Not Specified]</td>
<td>(Not Available)</td>
<td>Faculty Senate</td>
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Reviewed On: Not Yet Reviewed

Bluebook Number:
Approval Date:
ProposalID: 20431

Close
Graduate Council Subcommittee On New And Revised Programs And Courses

COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member Proposing Course: Chimay Anumba
College: ENGINEERING
Department or Instructional Area: ARCHITECTURAL ENGINEERING
College/Academic Unit With Curriculum Responsibility: ENGINEERING
Type of Proposal: □ Add  □ Change  □ Drop
Type of Review: □ Full  □ Expedited
(See Guide to Curricular Procedure for definitions of a full or expedited review.)
Course Designation: (C E 531 ) Legal Aspects of Engineering and Construction

Current Bulletin Listing

| Abbreviation | : C E |
| Number       | : 531 |
| Title        | : Legal Aspects of Engineering and Construction |
| Abbreviated Title | : LEG ASP ENG CONSTR |
| Credits      | : Min: 3  Max: 3 |
| Repeatable   | : No |
| Description  | : Basic legal doctrines, contractual relationships between parties, analysis of construction contract clauses, contract performance, and professional practice problems. |
| Prerequisites| : C E 431W |
| Concurrent Courses | : |
| Cross Listings | : |

Proposed Bulletin Listing (only displays changes)

| Abbreviation | : AE |
| Number       | : 531 |
| Title        | : |
| Abbreviated Title | : |
| Credits      | : Min:  Max: |
| Repeatable   | : No |
| Description  | : |
| Prerequisites| : n/a |
| Concurrent Courses | : |
| Cross Listings | : |

C E 531 will be added as a cross-listed course.
Does this Course have a Travel Component: No
Course Outline
A brief outline or overview of the course content
A listing of the major topics to be covered with an approximate length of time allotted for their discussion

Long Course Description:
A succinct stand-alone course description (up to 400 words) to be made available to students through the on-line Bulletin and Schedule of Courses.

This course provides an in-depth view into the legal issues facing the engineering and construction industry. Students will focus on three main topics in the course: the judicial system, the owner/design professional relationship, the owner/contractor relationship and the legal aspects facing these relationships. Students will analyze contract formation and interpretation, the judicial remedies for contract breach, the legal aspects in change orders, cost predictions, payments, delays in service, cessation of services and substantial completion. Students will also understand alternative resolution measures and arbitration. Students will be evaluated on their comprehension of the course through homework, exams and quizzes, class participation, and the successful completion of an oral presentation on a construction case study. This course will be an elective in the Architectural Engineering department, with a cross-listing in Civil Engineering. The course will be offered every Fall Semester.

The name(s) of the faculty member(s) responsible for the development of the course

Justification Statement
Instructional, Educational, and Course Objectives
Evaluation Methods
Relationship/Linkage of Course to Other Courses
Relationship of Course to Major, Option, Minor, or General Education
A description of any special facilities
Frequency of Offering and Enrollment

Justification for Changing the Course
The change of CE 531 to AE 531 is being made to change the home department of the course to the Architectural Engineering department due to the retirement of Civil Engineering faculty member and instructor of course Dr. H. Randolph Thomas.

Effective Date: Fall 2015

Consultation Summary/Response:

The Department of Civil and Environmental Engineering would approve that course name and number change from CE 531 to AE 531. Our graduate-level focus on construction engineering has constricted significantly. We would welcome AE teaching such a course.

Regards

Bill

William D. Burgos
Professor of Environmental Engineering
Graduate Officer
Department of Civil and Environmental Engineering
The Pennsylvania State University
212 Sackett Bldg
University Park, PA 16802-1408
phone: (814)-863-0578
e-mail: wdb3@psu.edu
http://www.engr.psu.edu/ce/enve/burgos/new/

- Concur/Approval
- Non-Concur/Rejected
- Pending Action(s)
- Awaiting Review
- Review Order
- Comment Response Required

**Required Signatories**

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<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
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<td>CIVIL AND ENVIRONMENTAL ENGINEERING</td>
<td>UNIVERSITY PARK CAMPUS</td>
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**Concur:**
- Peggy Johnson: Yes
  - Reviewed On: 4/15/2015 8:30:00 AM
  - Comment Response Required

- Lee Coraor: Not Yet Reviewed
  - Comments: Not Yet Reviewed
  - Reviewed On: Not Yet Reviewed

- Catherine M. Harmonosky: Not Yet Reviewed
  - Comments: Not Yet Reviewed
  - Reviewed On: Not Yet Reviewed

- Review on behalf of Interim Dean R. Vasilatos-Youken: Not Yet Reviewed
  - Comments: Not Yet Reviewed
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Bluebook Number: 
Approval Date: 
ProposalID: 20399
Graduate Council Subcommittee On New And Revised Programs And Courses

COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member Proposing Course: Chimay Anumba

College: ENGINEERING

Department or Instructional Area: ARCHITECTURAL ENGINEERING

Type of Proposal: ☑ Add ☐ Change ☐ Drop

Type of Review: ☑ Full ☐ Expedited

(See Guide to Curricular Procedure for definitions of a full or expedited review.)

Course Designation: (A E 881) Effective Facility Management and Planning

Proposed Bulletin Listing

Abbreviation : A E
Number : 881
Title : Effective Facility Management and Planning
Abbreviated Title : Facility Mgmt & Pl
Credits : Min: 3  Max: 3
Repeatable : No
Description : Course examines management skills necessary to effectively lead and manage a facility management organization

Prerequisites :
Concurrent Courses :
Cross Listings :

Does this Course have a Travel Component: No

Course Outline

A brief outline or overview of the course content

Strategic Planning and Organizational Structures
Measurement and Benchmarking
Change Management
Stakeholder Communications and Engagement
Staffing & Workforce Management and Development
Financial Analysis, Budgeting & Cost Control
Procurement, Vendor & Service Provider Management

A listing of the major topics to be covered with an approximate length of time allotted for their discussion

A. Strategic Planning and Organizational Structures (12)
   a. Definition of organizational mission and core competencies
   b. Identifying core services
   c. Strategic planning tools and processes
   d. FM Organizational Structures

B. Measurement and Benchmarking (4)
a. Defining key metrics  
b. Establishing processes to measure performance  
c. Identifying and locating industry best practices  

C. Change Management (4)  
a. Change management principles and theory  
b. Change management tools and approaches  
c. Changing corporate culture  

D. Stakeholder Communications and Engagement (8)  
a. Identifying key stakeholders  
b. Identifying communication requirements, tools and personnel  
c. Development of engagement plan and management of interfaces  

E. Staffing & Workforce Management and Development (5)  
a. Development of staffing plan  
b. Establishing metrics and key performance measures  
c. Development of workforce training and development plan  

F. Financial Analysis, Budgeting & Cost Control (5)  
a. Analyzing available tools, software and resources  
b. Establishing levels of delegated budgeting authority and responsibility  
c. Establishing key financial metrics and targets  
d. Establishing processes for review and oversight  

G. Procurement, Vendor & Service Provider Management (4)  
a. Identifying service needs and potential vendors  
b. Development of procurement contracting strategies  
c. Defining performance/delivery metrics and monitoring arrangements  

H. Presentations and Peer Review of Semester Projects (3)  
a. Student presentations and feedback on course project  

Long Course Description:  
A succinct stand-alone course description (up to 400 words) to be made available to students through the on-line Bulletin and Schedule of Courses.  
The course, Effective Facility Management and Planning, is designed to introduce students to the management skills that are necessary to effectively lead and manage a facility management organization. The content of the course is intended to provide the student with the knowledge, tools, and understanding of processes and tasks necessary to effectively lead a facility management organization within the framework of strategic planning, change management, communication, workforce planning and staff development, and financial analysis, budgeting and cost control. Additionally, AE 881 examines procurement, vendor and service management. The course delves into the traditional and innovative facility management organizational structure and the metrics involved in benchmarking. Students will be evaluated on their comprehension of the course through homework, exams, class participation, and successful completion of a culminating project. This course will be required by all MS degree students in the Facilities Engineering and Management program.  
The name(s) of the faculty member(s) responsible for the development of the course  
Dr. Chimay Anumba, Department Head, Department of Architectural Engineering  

Justification Statement  
Instructional, Educational, and Course Objectives  
The primary educational goal of this course is to develop analysis and decision-making skills that prepare students to take on a leadership role in a Facility Management Operation. An emphasis is placed on the tools and resources
necessary to take on a leadership role. This course assumes technical competency has been obtained in supporting
courses and focuses on applying the business and leadership needs to manage or direct a Facility Management
Operation.

Upon completion of this course students will be able to:
- Develop a high level strategic plan for a Facility Management Organization
- Establish Key Performance Metrics for a Facility Management Organization
- Develop or Analyze a Facilities Management Organizational Structure
- Develop a Facilities Management Organization staffing and development plan.
- Analyze the strengths and shortcomings of an existing corporate culture and effectively implement a change
management plan.
- Evaluate or develop a procurement strategy and plan for a Facility Management Organization.
- Develop and maintain an effective budget model for a Facility Management Organization.
- Analyze the return on investment for various aspects of a Facility Management Operation.

Evaluation Methods
Quantitative assessments of graded work will be used to develop grades using the current standard university scale
of evaluation. AE 881 will rely upon a variety of methods to assess and evaluate student learning, including:

a. Students will be evaluated on their ability to comprehend and understand materials presented in class and in
readings through the accurate and appropriate use of terminology in written discussion questions – 20%.

b. Exercises discussed in lectures will be extended into weekly homework assignments that will be linked to a
semester project. The accuracy of each student’s submissions will help assess the level of understanding of the topics
covered – 20%.

c. Exams where students demonstrate effective understanding of the subject matter - 30%.

d. An individual project will be evaluated based upon the level of application of concepts presented in class and
the overall quality of deliverables – 30%.

Relationship/Linkage of Course to Other Courses
AE 881 is proposed at the graduate (800) level because it emphasizes student activities that require higher-order
learning, especially in the analysis of strategic planning, benchmarking, change management, and organizational
structure. This course is proposed at the (800) level because it builds on undergraduate knowledge of the field which
aligns with the definition of an 800-level course.

There are no prerequisite courses for AE 881, however a working knowledge of the design and construction
industry and a general understanding of the operation and maintenance of a building are strongly encouraged.
Students in the MS in Facilities Engineering and Management are expected to be of graduate standing or have an
undergraduate degree in a cognate discipline. This course complements the other courses in the Facilities
Engineering and Management program.

Relationship of Course to Major, Option, Minor, or General Education
AE 881 is a required course in the Masters in Facilities Engineering and Management program in the Department
of Architectural Engineering within the College of Engineering. AE 881 may be applied to other Graduate Degree
programs in Architectural Engineering with permission of student’s graduate program adviser.

A description of any special facilities
Frequency of Offering and Enrollment
AE 881 will be offered at least once annually, during the Fall semester. Additional offerings during the Spring or
Summer sessions may be added to accommodate enrollment demands. It is expected to attract 15 – 20 students per
offering.

Effective Date: Fall 2015
Consultation Summary/Response:
From: Jeff Sharp [mailto:jeffsharp@psu.edu]
Sent: Tuesday, March 24, 2015 2:14 PM
To: Richelle B. Weiger
Subject: RE: Angel - Course approval

Hi Richelle,

Good old Angel. ;) The source of many an exciting moment at PSU.

Smeal approves AE 881 and wishes you much success.

All the Best,

Jeff

Jeffery M. Sharp | Associate Dean for Undergraduate Education
Smeal College of Business | The Pennsylvania State University | 202 Business Building | University Park, PA 16802
814 863-1947 (Office) | JeffSharp@psu.edu

= Concur/Approval = Non-Concur/Rejected
= Pending Action(s) = Awaiting Review
(#) = Review Order
= Comment Response Required

Formal Consultation

Name: Karen Thole  Department: MECHANICAL ENGINEERING
Position: Formal Consultant  Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HEAD MNE

Concur: Yes

Comments:
Reviewed On: 2/27/2015 1:46:00 PM
Respond To Comments

Name: Peggy Johnson  Department: CIVIL AND ENVIRONMENTAL ENGINEERING
Position: Formal Consultant  Campus: UNIVERSITY PARK CAMPUS
Title: DEPT HEAD CIVIL ENGR

Concur: Yes

Comments:
Reviewed On: 3/4/2015 11:50:00 AM
Respond To Comments
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<th>Name</th>
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<th>Position</th>
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<tbody>
<tr>
<td>Harriet Nembhard</td>
<td>IND &amp; MFG ENGR</td>
<td>Formal Consultant</td>
<td>PROFESSOR INDUSTRIAL ENGR</td>
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<tr>
<td>Chimay Anumba</td>
<td>(Not Available)</td>
<td>Department or Program Head</td>
<td>(Not Available)</td>
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|          | Concur: | Comments: Not Yet Reviewed | Reviewed On: | Not Yet Reviewed |

Bluebook Number:
Approval Date:
ProposalID: 20430

Close
Graduate Council Subcommittee On New And Revised Programs And Courses

COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member Proposing Course: Chimay Anumba
College: ENGINEERING
Department or Instructional Area: ARCHITECTURAL ENGINEERING

Type of Proposal: [✓] Add  [ ] Change  [ ] Drop
Type of Review: [✓] Full  [ ] Expedited
(See Guide to Curricular Procedure for definitions of a full or expedited review.)

Course Designation: (A E 581) Facilities Management Information Systems

Proposed Bulletin Listing

Abbreviation : A E
Number : 581
Title : Facilities Management Information Systems
Abbreviated Title : FM Info Systems
Credits : Min: 3  Max: 3
Repeatable : No
Description : Course examines the information systems necessary in effectively leading and managing a facility management organization

Prerequisites : 
Concurrent Courses : 
Cross Listings : 

Does this Course have a Travel Component: No

Course Outline

A brief outline or overview of the course content

Introduction to Information Management and Management Information Systems
Information Exchange, Integration, and Communication
Knowledge Management and Decision Support Systems
Building Automation and Control Systems (BACS)
Technologies for Facilities Information Management
Management of Facilities Information

A listing of the major topics to be covered with an approximate length of time allotted for their discussion

A. Introduction to Facilities Information Management (9)
   a. Key concepts
   b. Facilities data collection and analytics
   c. Benchmarking of facilities data
B. Information Exchange, Integration and Communication (6)
   a. Standards and technologies for facilities information exchange
   b. Integrated information systems
   c. Communication of facilities information
C. Knowledge Management and Decision Support Systems (6)
   a. The data, information and knowledge continuum
   b. Facilities knowledge management
   c. Decision support systems
D. Building Automation and Control Systems (BACS) (5)
   a. Introduction to building automation and control
   b. BACNET
   c. Building data visualization systems
   d. Sensors and wireless control systems
E. Technologies for Facilities Information Management (10)
   a. CMMS (Computerized Maintenance Management Systems)
   b. Building Information Modelling (BIM) for owners
   c. Geographic Information Systems (GIS)
   d. Space planning and management
F. Management of Facilities Information (9)
   a. Strategy formulation
   b. Procurement and management of facilities information systems
   c. Legal issues in managing facilities information

Long Course Description:
A succinct stand-alone course description (up to 400 words) to be made available to students through the on-line Bulletin and Schedule of Courses.

The course Facilities Management Information Systems is designed to introduce students to the information systems that are necessary to effectively manage a facility management organization. The content of the course is intended to provide the student with the knowledge, tools, and understanding of the information systems necessary to effectively lead a facility management organization within the framework of facilities data, analytics, and benchmarking procedures, and knowledge management systems. The course delves into information visualization, space planning and management, procurement and management of information systems, and legal issues of these systems. Upon completion of the course, students will be able to assess current and potential information systems and technologies required in effectively leading a facility management organization. Students will be evaluated on their comprehension of the course through class participation, homework, and exams. This course will be required by all MS degree students in the Facilities Engineering and Management program.

The name(s) of the faculty member(s) responsible for the development of the course
Dr. Chimay Anumba, Department Head

Justification Statement
Instructional, Educational, and Course Objectives

The primary educational goal of this course is to enable students to understand the importance and use of information systems in the management of facilities.

Upon completion of this course students will be able to:
- Describe the various types of information involved in the management of facilities
- Assess current and potential information systems and technologies for facilities engineering and management
- Identify requirements for and procurement of a new facilities management information system

Evaluation Methods

: Quantitative assessments of graded work will be used to develop grades using the current standard university scale of evaluation. AE 581 will rely upon a variety of methods to assess and evaluate student learning, including:

a. Students will be evaluated on their ability to comprehend and understand materials presented in class and in readings through the accurate and appropriate use of terminology in written discussion questions – 20%.

b. Exercises discussed in lectures will be extended into homework assignments. The accuracy of each student’s submissions will help assess the level of understanding of the topics covered – 20%.
c. Exams where students demonstrate effective understanding of the subject matter - 60%.

Relationship/Linkage of Course to Other Courses

AE 581 is proposed at the graduate (500) level because it emphasizes student activities that require higher-order learning, especially in the analysis of information management systems, information system procurement, and facilities data, analytics and benchmarking. This course is proposed at the (500) level because it builds on undergraduate knowledge of the field which aligns with the definition of a 500-level course.

There are no prerequisite courses for AE 581, however a working knowledge of the design and construction industry and a general understanding of the operation and maintenance of a building are strongly encouraged. Students in the MS in Facilities Engineering and Management are expected to be of graduate standing or have an undergraduate degree in a cognate discipline. This course complements the other courses in the Facilities Engineering and Management program.

Relationship of Course to Major, Option, Minor, or General Education

AE 581 is a required course in the Masters in Facilities Engineering and Management program in the Department of Architectural Engineering within the College of Engineering. AE 581 may be applied to other Graduate Degree programs in Architectural Engineering with permission of student’s graduate program adviser.

A description of any special facilities

Frequency of Offering and Enrollment

AE 581 will be offered at least once annually, during the Fall semester. Additional offerings during the Spring or Summer sessions may be added to accommodate enrollment demands. It is expected to attract 15 – 20 students per offering.

Effective Date: Fall 2015

Consultation Summary/Response:

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**Formal Consultation**

**Name:** Karen Thole  
**Department:** MECHANICAL ENGINEERING  
**Position:** Formal Consultant  
**Campus:** UNIVERSITY PARK CAMPUS  
**Title:** DEPT HEAD MNE  
**Concur:** Yes  
**Reviewed On:** 2/27/2015 1:45:00 PM  
**Respond To Comments**

**Name:** Peggy Johnson  
**Department:** CIVIL AND ENVIRONMENTAL ENGINEERING  
**Position:** Formal Consultant  
**Campus:** UNIVERSITY PARK CAMPUS
DEPT HEAD CIVIL ENGR

Concur: Yes
Comments: Reviewed On: 3/4/2015 11:51:00 AM
Respond To Comments

Name: Harriet Nembhard
Department: IND & MFG ENGR
Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR INDUSTRIAL ENGR
Concur: Yes
Comments: Reviewed On: 3/5/2015 6:12:00 PM
Respond To Comments

Name: Raj Acharya
Department: COMPUTER SCIENCE AND ENGINEERING
Campus: UNIVERSITY PARK CAMPUS
Title: PROFESSOR & Head OF CSE
Concur: Yes
Comments: CSE concurs.
Reviewed On: 3/23/2015 1:52:00 PM
Respond To Comments

Required Signatories

Name: Chimay Anumba
Department: (Not Available)
Campus: (Not Available)
Title: Department or Program Head
Concur: Not Yet Reviewed
Comments: Not Yet Reviewed
Reviewed On: Not Yet Reviewed

Name: Lee Coraor
Department: (Not Available)
Campus: (Not Available)
Title: College Representative
Concur: Not Yet Reviewed
Comments: Not Yet Reviewed
Reviewed On: Not Yet Reviewed

Name: Catherine M. Harmonosky
Department: (Not Available)
Campus: (Not Available)
Position: Dean of the College
Title: (Not Available)

Concur: Not Yet Reviewed
Comments: Not Yet Reviewed
Reviewed On: Not Yet Reviewed

Name: Review on behalf of Interim Dean R. Vasilatos-Younken
Department: (Not Available)
Position: Dean of the Graduate School
Campus: (Not Available)

Title: (Not Available)

Concur: Not Yet Reviewed
Comments: Not Yet Reviewed
Reviewed On: Not Yet Reviewed

Name: Committee feedback/Chairs J. Redwing and C.A. Cole
Department: (Not Available)
Position: Graduate Council Subcommittee
Campus: (Not Available)

Title: (Not Available)

Concur: Not Yet Reviewed
Comments: Not Yet Reviewed
Reviewed On: Not Yet Reviewed

Name: [Name Not Specified]
Department: (Not Available)
Position: Faculty Senate
Campus: (Not Available)

Title: (Not Available)

Concur: Not Yet Reviewed
Comments: Not Yet Reviewed
Reviewed On: Not Yet Reviewed

Concur: Not Yet Reviewed
Comments: Not Yet Reviewed
Reviewed On: Not Yet Reviewed

Bluebook Number:
Approval Date:
ProposalID: 20432

Close
Graduate Council
Program, Option, or Minor Proposal Form

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Curriculum Coordinator, University Faculty Senate, 101 Kern Graduate Building, University Park. The proposals will be transmitted to the Office of the Dean of the Graduate School for entry into the Graduate Council curricular review process; for more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

College/School:  College of Liberal Arts
Department or Instructional Area:  Department of Political Science

New Graduate Program, Option, or Minor:  □ Add
Designation of new graduate program:  Social Data Analytics
Classification of Instructional Programs (CIP) Code:  45.0122
Designation of new graduate option:
Designation of new graduate minor:  Social Data Analytics

Indicate effective semester:
□ First semester following approval
□ Second semester following approval

Existing Graduate Program Option, or Minor:  □ Change  □ Drop
Current designation of graduate program:
Current designation of graduate option:
Current designation of graduate minor:

New designation of existing graduate program (if changing):
New designation of existing graduate option (if changing):
New designation of existing graduate minor (if changing):

Brief description of the change (if not noted above):

Indicate effective semester:
□ First semester following approval
□ Second semester following approval

Submitted by Graduate Program Head
Lee Ann Kanaszak  Signature  Date:  4/14/15

Noted by College/School Representative to Graduate Council Subcommittee on New and Revised Programs and Courses:
Jennifer Wagner-Leader  Signature  Date:  4/15/15

Approved by College/School Dean/Chancellor (or Designee):
Eric Silver  Signature  Date:  4/15/15
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A Proposal to Graduate Council to Establish a Dual-Title Doctoral Degree Program in Social Data Analytics

Submitted by
Department of Political Science

Contact:

Burt Monroe
Associate Professor, Department of Political Science
Pond Laboratory 230
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814-867-2726
I. Objectives and Justification for the Social Data Analytics Program

A. Need for the Social Data Analytics Program

In response to ubiquitous and massive new sources of data, data science and analytics are emerging as new trans-disciplinary fields of inquiry, merging statistics, computer science, and visual analytics. Perhaps the greatest challenges and opportunities arise in particular from socially-generated big data, observed as a result of human interaction. As contemporary interactions become increasingly instrumented, recorded via web, mobile device, and distributed sensors, and as historic interactions become more easily quantifiable through digitization and sharing of document and image archives, society faces a transformative and disruptive data deluge, from which new scientific, economic, and social value can be extracted.

Big and complex social data challenge existing research models in the social sciences, in the computational and information sciences, and in the sciences of statistics and visualization. The scale and complexity of data has begun to overtake the capabilities of hardware, algorithms, and research designs of conventional social science, forcing us to reconfigure ourselves to face a new world of data-intensive social science. Conversely, the practices, concerns, and standards of statistics and social science methodology – reliability, validity, uncertainty, causality, ethics of human subjects research – challenge emerging practices in the new fields of data science and data analytics. As a result, big and complex social data overwhelm current disciplinary PhD training models.

In 2009, the Penn State Quantitative Social Science Initiative began discussions with faculty across Penn State about mechanisms for leveraging existing and emerging strengths in component disciplines to develop an interdisciplinary training model to meet these challenges. This culminated in 2012 with the awarding of a $3 million grant from the National Science Foundation’s Integrative Graduate Education and Research Traineeship (IGERT) program (which has received further support totaling over $2 million from the College of Liberal Arts, the College of Human Health & Development, the College of Information Sciences & Technology, the College of Earth & Mineral Sciences, the College of Sciences, the College of Engineering, the Social Science Research Institute, the Institute for CyberScience, and the Office of the Vice President for Research) to develop a new model for interdisciplinary PhD training in “Big Data Social Science,” to be instantiated in a new dual-title PhD program in “Social Data Analytics.”

Since 2012, the Big Data Social Science IGERT (BDSS-IGERT) has funded three cohorts totaling 19 PhD students, and selected a fourth cohort of six PhD students – in Political Science, Human Development & Family Studies, Sociology, Demography, Statistics, Geography, and Information Sciences & Technology –

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1 The IGERT (and now National Research Traineeship - NRT) programs are highly competitive and an explicit strategic target of the University’s Strategic Initiatives and Research Office (SIRO). SIRO’s official best practice guidelines, which govern the internal “downselect” process to determine the Penn State submission, include the proposal of a dual-title degree: [https://www.research.psu.edu/limitedsubs/information/igert/IGERT_BP_Recomm.pdf](https://www.research.psu.edu/limitedsubs/information/igert/IGERT_BP_Recomm.pdf). Penn State’s only other successful IGERT is instantiated in the Dual-Title Graduate Program in Biogeochemistry: [http://www.biogeochemistry.psu.edu/](http://www.biogeochemistry.psu.edu/).
for two-year traineeships involving research rotations, collaborative research projects, externships, and a transitional curriculum in Social Data Analytics. The proposed degree is as developed, refined, and detailed in the multiyear IGERT proposal process, and as refined through the experience of the first three years of BDSS-IGERT.

A unique and defining feature of the proposed Social Data Analytics dual-title PhD degree program, within the current explosion of programs in “data science,” “analytics,” “big data,” and similar areas, is the focus on integration of a social science orientation to the field of study. We distinguish this, sharply, from the usual characterization of social science as a “domain” of data science, and characterize social scientific thinking as a core pillar of Social Data Analytics.

Further, the multidisciplinary, comparative intellectual vision of the proposed Dual-Title Doctoral Degree Program in Social Data Analytics is fundamental to the mission of Penn State’s College of the Liberal Arts (CLA), as enunciated in the College’s Strategic Plan for 2014-2019, titled “Excellence for the 21st Century.” In this document, CLA makes the following commitment to the development of new and exciting intellectual programs, including dual-title doctoral degree programs:

“Drawing on our past success with innovative dual-title PhD programs, we will continue to invest strategically in new interdisciplinary dual-title programs. Specifically, we will continue to provide substantial support for our NSF-funded big data social science IGERT graduate training program, which spans several disciplines and colleges. We aim to develop a dual-title PhD program in Social Data Analytics and create an undergraduate degree and MPS in social data analytics both in-residence and online.”

Despite the push for training in the field of Big Data and Social Science, only a few cohesive doctoral level programs exist to date and most do not provide multidisciplinary degrees: Stanford’s Social Data Lab and Harvard’s Institute for Quantitative Social Science are great examples of sites for big data research in the social sciences, but do not offer doctoral programs. Most of the programs available are Master’s program and few, if any, focus on big data in the social sciences. Anecdotal evidence of extensive interest in this type of program is found in the queries, calls and emails received from students, directors of graduate studies and other faculty since the announcement of the Big Data Social Science IGERT award at Penn State in September 2012. The proposed dual-title program will leverage the collaborative relationships, activities and funding established within the ongoing IGERT program as a foundation on which to build a program for the study of big data integrating a social science orientation. Owing to its uniqueness, the proposed program provides an academic niche, which will contribute to Penn State’s vision of becoming a leader in multidisciplinary, international, and multicultural scholarship. Moreover, we aim not only to place graduates in highly competitive academic positions to lead this new science, but also to demonstrate the relevance of PhD training for some portion of those nonacademic positions in “deep analytics.” This is a particularly disruptive way to think of PhD education in the social sciences, where academic employment has been the primary focus.

2 Appendix B lists some examples of related degree programs on offer and under development. Very few are at the PhD level, even fewer involve the social sciences, and to our knowledge none other is centered in the social sciences.

3 http://www.la.psu.edu/about/documents/LiberalArtsStrategicPlan81214.pdf/at_download/file
In summary, the proposed dual-title doctoral degree program will:

- Provide a cohesive curriculum for in-depth training in a core discipline of social, computational, statistical, or visual analytic science sufficient to succeed in that discipline, and a breadth of training across all four, sufficient to lead in the emerging field of social data analytics.
- Train PhDs who expand the capabilities of social data analytics, and use those capabilities creatively to answer important social scientific questions and to address grand social challenges.
- Supply, to both the academic and nonacademic markets, PhDs whose training leads them to instinctively consider diverse and multinational perspectives on social data issues, to instinctively and effectively prioritize ethics, scientific responsibility, and social consequences in the creation and use of social data, and to communicate effectively with both scientific and nonscientific audiences.

B. Social Data Analytics as a Field of Study and Research

The new trans-disciplinary field that is emerging, referred to in this proposal as Social Data Analytics, is a field that requires integrative contributions from the social sciences, the computational sciences, statistics, and visual analytics. Data analysis is the act of drawing useful information out of data. Analytics is data analysis where scale or complexity exceeds standard computational implementations. This is what we mean by the shorthand “big data.” Data can be big in number of observations (“web-scale” data, censuses). Data can be big in density of observations (digital video). Data can be big in number of variables (“high-dimensional” data, document word counts, genomes). Data can be big in pace of generation (social media). Data can be big in complexity, capturing intricate relationships and interdependencies (networks, hierarchies, spatiotemporal data). Each of these moves us from data analysis to analytics.

Social data analytics integrates four general approaches to the science and practice of analytics. Computational analytics encompasses approaches to analytics from the computational and information sciences, and includes topics like machine learning, algorithmic scaling, information retrieval, knowledge representation, and distributed data architectures. Statistical analytics encompasses approaches to analytics from statistics, and includes topics like theories of inference, statistical learning, statistical computing, computational statistics, statistical privacy, and statistical graphics. Visual analytics, “the science of analytical reasoning facilitated by interactive visual interfaces,” is an interdisciplinary science combining elements of computational and statistical analytics with the cognitive and decision sciences. Social scientific analytics encompasses not only “domain” knowledge about particular social data-generating processes, but also a concern for inferential and theoretical validity that underlies methods for measurement of latent concepts, experimental and sampling designs, techniques for causal and structural inference, as well as the ethical and social consequences of human subjects research.

These four approaches converge in the presence of big social data. We consider data to be social when it arises as the result of human interaction. Interactions can be of many kinds (communication, transaction, reaction, relationship), and observed at the level of individuals (survey response, votes, purchases), groups and organizations (advertising, rebellion, advocacy, recruitment, education,
segregation), and nations (trade, conflict, population movements). Actions at, and interactions among, all of these levels take place in a variety of contexts, in geographic space, over time, across multiple scales, and across billions of individuals embedded in complex networks and hierarchies of relationships. As these complexities become increasingly instrumented and observable, our need for analytics grows.

Social Data Analytics (SoDA) is the integration of these four scientific approaches – social science methodology, computational analytics, statistical analytics, and visual analytics – to draw useful knowledge from big and complex social data.

C. Professional Associations and Journals
Each of the component disciplines has peak / umbrella professional organizations which have sections, divisions, special interest groups, etc., engaged in related research, providing relevant disciplinary homes for the interdisciplinary work of social data analytics. Prominent examples include:

- The American Political Science Association, especially the Political Methodology and Political Networks sections, and the Society for Political Methodology
- The American Sociological Association, especially the Methodology, Communication and Information Sciences sections, the International Sociological Association, especially the Research Committee on Logic and Methodology.
- The American Psychological Association, especially the Division for Quantitative and Qualitative Methods.
- The Association for Computing Machinery (ACM), especially the special interest group in Knowledge Discovery in Data (SIGKDD).
- The Institute of Electrical and Electronics Engineers (IEEE), especially the Computational Intelligence and Computer Society Visualization and Graphics Technical Community.
- The American Association of Geographers, especially the specialty groups on Geographic Information Science & Systems, Spatial Analysis & Modeling, and CyberInfrastructure.

In the last several years, new professional organizations have emerged specifically around the areas of data science and big data, most prominent among them:

- The Data Science Association - an academic-oriented professional association, which has promulgated a code of conduct.
- The American Association of Big Data Professionals, an industry-oriented professional association.

There are essentially uncountable scientific outlets for social data analytics, including general domain-specific outlets across our many component disciplines. Examples of new journals and peer-reviewed conferences that have emerged as particularly likely to feature social data analytics research include:

- ACM Transactions on Database Systems*
• ACM Transactions on Intelligent Systems and Technology
• Analytical Geospatial Digital Earth*
• Artificial Intelligence, AAAI Conf on (AAAI)*
• Association for Computational Linguistics (ACL)
• Big Data & Society
• Computers in Human Behavior
• Computational Linguistics, Intl Conf (COLING)*
• Cyberpsychology, Behavior and Social Networking
• Databases and Social Networks, ACM SIGMOD Workshop on (DBSocial)*
• GIScience*
• Human Ecology
• Information, Communication and Society
• Information Visualization, IEEE (InfoVis)*
• Intelligent Systems, IEEE*
• International Cartographic Conference (ICA/ACI)*
• Information Systems for Crisis Response and Management, Intl Conference (ISCRAM)*
• International Journal of Social Research Methodology
• Journal of Computer-Mediated Communication
• Journal of Artificial Societies and Social Simulation
• Journal of Mathematical Sociology
• Neural Information Processing Systems, Conf (NIPS)*
• New Media and Society
• Nonlinear Analysis: Real World Applications
• North American Assoc for Computational Linguistics - Human Language Technologies (NAACL HLT)*
• Political Analysis*
• Political Science Research and Methods*
• PLoS ONE*
• Psychological Methods
• Social Computing, Behavioral-Cultural Modeling, & Prediction, Intl Conference (SBP)*
• Social Indicators Research
• Social Science Computer Review*
• Sociological Methods and Research
• Sociological Methodology
• Social Networks*
• Spatial Information Theory, Conference *
• Visual Analytics Science and Technology, IEEE (VAST)*
• Web Intelligence and Intelligent Agent Technology, IEEE/WIC/ACM Intl (WI-IAT)*

* Indicates an actual outlet for a published article on a social data analytics topic reported by students affiliated with Big Data Social Science IGERT since 2012.
D. Potential Student and Employment Opportunities

1. Graduate Student Recruitment and Program Constituency

BDSS-IGERT and the proposed SoDA program are already impacting recruiting in our component departments. Within the Political Science PhD, two-thirds of accepted applicants now express an interest in political methodology as a subfield, and over half of those express interest in participation in BDSS-IGERT or the proposed degree in Social Data Analytics. During the 2015 recruiting season, applicants to every participating PhD program expressed interest and met with faculty participating in BDSS-IGERT.

In the last three years, the Statistics PhD has seen a sea change in the number of US citizens applying and accepting admission, a substantial number of whom express interest in big data and social scientific areas of application. At least five of the 12 BDSS-IGERT PhD students in cohorts 2 (2013-2015) and 3 (2014-2016) chose Penn State explicitly because of the opportunity for social data analytics training.

In addition, the combination of interests that comprise Social Data Analytics – infusing social science fields with modern data science, and infusing technical fields with social relevance – has led to substantial impacts in the diversification of the component programs. In its first three years, BDSS-IGERT has supported two students of African descent, two students of Native American descent, one Latino student, and nine women, a dramatic improvement on typical representation in the component STEM fields.

2. Enhancement of Graduate Student Research

The proposed dual-title Ph.D. degree program in Social Data Analytics will provide important skills and cross-disciplinary knowledge base that will enhance students’ existing research and therefore their future placements in academic and non-academic positions. The proposed dual-title degree in Social Data Analytics will increase the students’ skills and research capacity in a number of areas including but not limited to: the development of new practices in social science methodology, increased capacity to deal with new and various sources of data, faster collection of original data through automated techniques, and social scientific insight for improved data science practice.

These skills will be developed through coursework and interaction with cross-disciplinary faculty from the Social Data Analytics faculty who serve on the students’ doctoral committees. The Graduate Faculty members for the proposed Social Data Analytics program are already linked together through the existing Big Data Social Science NSF IGERT program and its ongoing research projects and events (for more information see http://bdss.psu.edu). Doctoral students will be encouraged to participate in ongoing events, work on independent and faculty research projects, as well as network with other researchers utilizing these skills both inside and outside of academia. This will create opportunities for students to establish their own research programs. Dual-title doctoral degree students will also be encouraged to participate as coauthors in faculty research (grants, papers, book chapters, etc.), thereby further enhancing their future employment potential.
3. Mentoring
As part of the proposed dual-title program, it will be required that at least one Social Data Analytics graduate faculty member will serve on the student’s doctoral committee as chair or co-chair (in accordance with Graduate Council regulations). It is further recommended that the role of Outside Field Member and Outside Unit Member be played by a second member of the Social Data Analytics graduate faculty whose primary appointment is outside the student (and chair’s) primary program. This faculty member, along with their home department adviser and other committee members, will also serve as the student’s mentor in terms of selection of dissertation topic, which will include a substantial social data analytics focus, and provide advice on funding sources and publication of the student’s research.

In addition, the proposed program will include opportunities to collaborate with students and faculty from other disciplines through research projects and possible externships. The proposed program will leverage the relationships with faculty and outside partners established within the Big Data Social Science IGERT program, which will run through 2018. Once the IGERT award is completed (2018), students who are supported by graduate assistantships or fellowships from their home departments will teach or have research assignments in roles and circumstances determined by their home department and SoDA programs.

4. Graduate Student Placement
The academic training received by the student through the Dual-Title Doctoral Degree Program in Social Data Analytics will make the student an attractive prospect for positions in academia, federal and state agencies, national and international business, and non-governmental organizations.

The Social Data Analytics dual-title program has been developed under the auspices of the NSF-funded IGERT in Big Data Social Science, which began in 2012. As a program primarily for students in the second and third year of their PhD, the IGERT not yet had a Trainee complete their PhD and enter the academic job market. There are, however, several indicators that the market for its graduates is robust.

Several late-stage graduate students participated in first cohort IGERT activities as Affiliates and/or predoctoral fellows of the parent Quantitative Social Science Initiative. The four who have completed their PhDs hold the following positions:

- Assistant Professor (tenure track) of “political methodology,” Department of Political Science, University of Minnesota, in Minneapolis (Political Science PhD).
- Senior Data Scientist, RPX Corporation, San Francisco (Political Science PhD).
- Assistant Professor (tenure track) of “data-intensive political science,” School of Economic, Political, and Policy Sciences, University of Texas at Dallas, after postdoctoral fellowship with the Data Science group at the Institute for Quantitative Social Science at Harvard University (Political Science PhD).
- Postdoctoral Fellow, Center for Research on Computation and Society, Harvard University (Statistics PhD).

Two Trainees of the IGERT have taken full-time nonacademic positions as ABDs. These are:
• Senior Data Analyst, Caerus Analytics in Washington DC (ABD, Political Science)
• Lead Outreach Coordinator & Senior Visualizer, NASA Earth Observatory, Goddard Space Flight Center, in Greenbelt, MD (ABD, Geography).

Perhaps the best indicator of demand for SoDA students can be seen in the BDSS-IGERT externship program. All Trainees and Associates of the Big Data Social Science IGERT engage in two summer externships. The breadth of demand, from high quality and highly competitive academic, government, nonprofit, and industry employers across a range of sectors, is indicative of the demand for SoDA students. From 2012-2015, these have included:

• Google (Palo Alto) [Statistics PhD student]
• IBM Research (Almaden) [IST]
• Eric & Wendy Schmidt Data Science for Social Good Fellowship (Chicago) [Political Science]
• Scitor (Aurora, CO) [Statistics]
• The Family Institute (Evanston, IL) [HDFS]
• Caerus Analytics (Arlington, VA) [Political Science]
• Parus Analytics (Charlottesville) [Political Science]
• US Census Bureau (Washington) [Demography]
• Oak Ridge National Laboratories (Knoxville) [Geography]
• Pew Research Labs (Washington) [Sociology & Demography]
• German Institute for Economic Research (Berlin) [HDFS]
• United Airlines (Chicago) [Statistics]
• WaterSmart (San Francisco) [Sociology & Demography]
• Longitudinal Studies Centre Scotland (Edinburgh), Synthetic Data Estimation Project [Statistics]
• Harvard University, Institute for Quantitative Social Science [Political Science]
• Harvard University, Center for Geographic Analysis, World Map Project [Political Science]
• City University London, giCentre, Department of Computer Science [Geography]
• Peking University, Key Laboratory of Machine Perception [IST]
• ETH-Zurich, Geographic Information Visualization and Analysis (GIVA) Unit [Geography]
• University of Utah, Life-Span Development and Adaptation Lab [HDFS]
• City University of New York - Baruch, Institute for Demographic Research [Demography]
• University of Massachusetts, Computational Social Science Institute [IST]
• University of Illinois-Chicago, Institute for Health Research and Policy [Geography]

E. Graduate Minor in Social Data Analytics
Associated with the proposed dual-title PhD degree program, a doctoral minor will be available. For graduate students who may not be able to take advantage of the dual degree program (i.e., students in the Sociology and Demography dual-title PhD) or for whom the doctoral minor would provide the needed training and exposure to the SoDA curriculum to satisfy their respective career goals, the doctoral minor will make sense. Taking advantage of curriculum already proposed for the dual-title degree, the offer of the minor will not increase the burden for establishing the dual-title, but will enhance the overall program by bringing additional students from a variety of disciplines into the group. Students in the minor have reduced coursework expectations and do not have the same requirements in terms of candidacy exams, comprehensive exams, and dissertation.
F. Description of Required Social Data Analytics Coursework

1. Coursework

The minimum coursework requirements for the dual-title Ph.D. degree in Social Data Analytics are as follows:

- Course work and other requirements of the primary program.
- SO DA 501\(^4\) (3 credits)
- SO DA 502\(^5\) (3 credits)
- 12 or more elective credits in Social Data Analytics from a list of courses maintained by the Social Data Analytics Committee.\(^6\) Collectively the elective credits must satisfy the following requirements:
  - (A) Core analytics distribution. 3 or more credits in courses focused on statistical learning, machine learning, data mining, or visual analytics. Courses approved as meeting this requirement are designated (A) on the list of approved electives.\(^7\)
  - (Q) Quantification distribution. 6 or more credits in courses focused on statistical inference or quantitative social science methodology. Courses approved as meeting this requirement are designated (Q) on the list of approved electives.\(^8\)
  - (C) Computational / informational distribution. 6 or more credits in courses focused on computation, collection, management, processing, or interaction with electronic data, especially at scale. Courses approved as meeting this requirement are designated (C) on the list of approved electives.\(^9\)
  - (S) Social distribution. 6 or more credits in courses with substantial content on the nature of human interaction and/or the analysis of data derived from human interaction and/or the social context or ethics or social consequences of social data analytics. Courses approved as meeting this requirement are designated (S) on the list of approved electives.\(^10\)
  - Cross-departmental distribution.
    - 3 or more credits in approved courses with the prefix STAT or that of a primarily social science department.\(^11\)
    - 3 or more credits in approved courses with the prefix IST, GEOG, or that of a primarily computer science or engineering department.

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\(^4\) SODA 501 has been proposed as a permanent course and is under review. A course description is provided in Appendix E.

\(^5\) SODA 502 has been proposed as a permanent course and is under review. A course description is provided in Appendix E.

\(^6\) The current version of this document is included as Appendix C.

\(^7\) Approved courses designated (A) include IST 557, 558, 561; STAT 557, 558; CMPSC 448; CSE 584, 561; IE 561. See Appendix C for details.

\(^8\) Approved courses designated (Q) include most 500-level courses or above carrying the prefix STAT, most social science methodology courses (including CRIM 515; PL SC 501, 502, 503, 504, 505, 506, 518, 519; HD FS 503, 516, 519, 523, 526, 527, 528, 530, 534, 536; SOC 513, 515, 518, 519, 527, 537, 574, 575, 576, 577, 578, 579), as well as CMPSC 448; CSE 550, 551, 552, 553, 554, 555, 556, 557, 560, 561, 562, 564, 583, 584, 585, 586; GEOG 586; IE 561; IST 556, 557, 558, 561, 562. See Appendix C for details.

\(^9\) Approved courses designated (C) include CMPSC 431W, 448, 454; CSE 520, 522, 530, 531, 532, 537, 541, 542, 550, 551, 552, 553, 554, 555, 556, 557, 560, 561, 562, 564, 565, 583, 584, 585, 586, 588; GEOG 501D, 500, 560, 565, 571, 583, 584, 585, 586, 588; 591; IE 561; IST 441, 510, 520, 521, 526, 530, 555, 586, 587, 588, 591; IE 561; IST 441, 510, 520, 521, 526, 530, 555, 556, 557, 558, 562. See Appendix C for details.

\(^10\) Approved courses designated (S) include most courses at the 500-level or above carrying one of the prefixes CRIM, DEMOG, HDFS, PLSC, SOC, as well as GEOG 501B, 501C, 520, 571, 588, 591; IST 520, 521, 526, 530, 555; STAT 507, 509. See Appendix C for details.

\(^11\) This includes any approved course with a prefix CRIM, DEMOG, PLSC, SOC, or HD FS.
- 6 or more credits in approved courses outside the primary program.
- 3 or fewer credits in approved courses at the 400-level.

Students or faculty may request that the Social Data Analytics Committee consider approval of elective designations for any course, including temporary approvals for experimental or variable-title courses. Students are encouraged to take interdisciplinary courses that carry multiple (A), (Q), (C), (S) designations, as well as to select SoDA electives that also meet requirements of the primary program. Within this framework, final course selection is determined by the student in consultation with academic advisers from their home department and Social Data Analytics.

Through satisfaction of home degree requirements, and appropriate choice of electives to satisfy multiple criteria, students may satisfy these requirements with as few as 12 credits outside their home program (SoDA 501, SoDA 502, and 6 credits of appropriate interdisciplinary electives). In particular, students are encouraged to take courses carrying multiple AQCS designations. Table 1 provides illustrative examples of courses with multiple AQCS designations. A complete current listing is provided in Appendix C. (There is no formal maximum number of credits from the primary degree that can be double-counted toward the SoDA degree. For those meeting the SoDA elective requirement with the minimum of 12 credits, the outside-program minimum effectively limits the number of primary degree credits that count toward SoDA at 6. Adopting programs and advising committees may limit the number of credits taken for the SoDA degree that can count toward home degree requirements.)

Examples of possible course selections appropriate for students in particular participating PhD programs, as well as examples of coursework chosen by recent BDSS-IGERT Trainees, is provided in Appendix E. Please note that while many of the courses selected currently carry temporary courses numbers (597, in particular), none of these is a required course. Only SoDA 501 and SoDA 502 must be accepted and provided as permanent courses to ensure students in each participating department can progress efficiently through the degree.
Table 1: Examples of 500-Level Courses Carrying Multiple AQCS Designations

<table>
<thead>
<tr>
<th>Department/#</th>
<th>Course Title</th>
<th>A</th>
<th>Q</th>
<th>C</th>
<th>S</th>
<th>DC1</th>
<th>DC2</th>
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<tbody>
<tr>
<td>IST 557/558</td>
<td>Data Mining I / II</td>
<td></td>
<td>X</td>
<td></td>
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<td>X</td>
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<tr>
<td>STAT 557/558</td>
<td>Data Mining I / II</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 597</td>
<td>Visual Analytics using Geo-Social Data (MacEachren)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>HD FS 597</td>
<td>Intro to Data Mining for Human Development (Brick)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IE 561</td>
<td>Data Mining Driven Design</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>CSE 597</td>
<td>Advanced Big Data Analytics (Kifer)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 597</td>
<td>Visualization &amp; Adv Analysis of Social Networks (Yen)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 597</td>
<td>Spatio-Temporal Movement Analysis (Andris)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>HD FS 597</td>
<td>Bayesian Meth for Human Dev &amp; Fam Stud (Oravecz)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>PL SC 597</td>
<td>Event Data Analysis (Schröd)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSE 597</td>
<td>Data Privacy, Learning, and Statistical Analysis (Kifer)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
<td>STAT 597</td>
<td>Privacy in Large Statistical Databases (Slavkovic)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td></td>
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<tr>
<td>SOC 597</td>
<td>Methods of Social Network Analysis (Felmlee)</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>GEOG 560</td>
<td>Interpersonal Relationships in Geographic Space</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>IST 555</td>
<td>Intelligent Agents and Distributed Decision Making</td>
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<td>X</td>
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<tr>
<td>PL SC 551</td>
<td>Big Data App to the Study of Representation (Monroe)</td>
<td>X</td>
<td>X</td>
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<tr>
<td>CSE583/EE552</td>
<td>Pattern Recognition—Principles and Applications</td>
<td>X</td>
<td>X</td>
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<tr>
<td>CSE 586</td>
<td>Topics in Computer Vision</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>STAT 540</td>
<td>Computational Statistics</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>GEOG 586</td>
<td>Geographical Information Analysis</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>IST 556</td>
<td>Web Analytics: Research Approaches for Online Data</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>IST 597</td>
<td>Big Data Fundamentals (Giles / Yen)</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>HD FS 530</td>
<td>Longitudinal Structural Equation Modeling</td>
<td>X</td>
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<tr>
<td>PL SC 505</td>
<td>Time Series Analysis in Political Science</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>PL SC 518</td>
<td>Survey Methods</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>PL SC 597</td>
<td>Measurement Theory (Fariss)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL SC 597</td>
<td>Causal Inference (Keele)</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>SOC 578</td>
<td>Multilevel Regression Models</td>
<td>X</td>
<td>X</td>
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<tr>
<td>SOC 579</td>
<td>Spatial Demography</td>
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<td>X</td>
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<tr>
<td>STAT 507</td>
<td>Epidemiologic Research Methods</td>
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<td>X</td>
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<tr>
<td>PHYS 580</td>
<td>Elements of Network Science and Its Applications</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

These are illustrative examples. A complete listing of approved courses and designations is provided in Appendix C.
G. Faculty Experience with Graduate Programs and Students
Most members of the SoDA graduate faculty were directly involved in the development of the Social Data Analytics Program through the development of the proposal for BDSS-IGERT. This built on existing relationships for interdisciplinary research and training developed through the Quantitative Social Science Initiative (QuaSSI), the CyberScience TaskForce, the Network Science Initiative, the Social Science Research Institute, the Institute for CyberScience, the Quantitative Development Research Group, and participating research centers including GeoVISTA, StudioLab, the Methodology Center, the Population Research Institute, and the Intelligent Information Systems Research Lab. Nearly all members of the Social Data Analytics graduate faculty have acted as advisers or research rotation hosts for PhD students in BDSS-IGERT, mentors for methodological projects of QuaSSI predoctoral fellows, and/or teach graduate seminars of core interest to Social Data Analytics students.

Four members of the Social Data Analytics graduate faculty (Hardy, Slavkovic, Klippel, and Matthews) are current Directors of participating PhD programs, and two of those (Hardy and Slavkovic) serve on the Social Data Analytics program committee. Between 2006 and 2014, Director Burt Monroe (a former Director of Graduate Studies) supervised funded research activities of 57 PhD students for over 150 student-semesters, 25 of them in Political Science and 32 in other departments, through QuaSSI, BDSS-IGERT, or externally-funded research. He currently serves on doctoral committees in Political Science, IST, Computer Science & Engineering, Statistics, Sociology, Economics, and Geography. Of 26 Political Science PhD students who completed their degrees between 2010 and 2014, 14 were partially funded and supervised by Monroe through one of these programs. Of these 14, nine hold tenure-track positions, five postdocs, one a visiting position, and one an industry data science position.

H. Costs
Students enrolled in the dual-title degree program should expect to spend one to two extra semesters to obtain the dual degree. Advisers will assist the student to select his/her courses in order to ensure that all degree requirements are satisfied in a timely manner. Funding is currently available through 2018 to offset tuition and stipend costs for two years for up to six students/year enrolled in the SoDA dual degree program, who are also IGERT Trainees.

I. Funding Opportunities for Dual-Title Doctoral Students
Primary graduate funding will come from home-department funds although in the early years partial graduate funding for PhD candidates in the dual-title doctoral degree program may be provided by the Big Data Social Science IGERT program. Once the IGERT award is completed (2018), students who are supported by graduate assistantships or fellowships from their home departments will teach or have research assignments in roles and circumstances determined by the home department and SoDA programs. Because social data analytic skill sets are highly valued by grant active faculty, we do not anticipate any issues with student funding after 2018 (completion of NSF IGERT award period).

Students will receive every available support from the home department and SoDA graduate faculty to write grants to support their field research and other academic endeavors. Students will also be given every opportunity to participate in the efforts of the SoDA graduate faculty to secure extramural funding. External funding by SoDA graduate faculty also may provide additional graduate funding.
J. Projected Size of Program, Impact on Other Courses and Faculty Load

At its inception, the program will have 2-3 students (students who are Fellows/Trainees in the Big Data Social Science IGERT program and have Political Science as home department). Assuming anticipated early adoptions of the dual-title SoDA program (by Information Sciences & Technology, Statistics, Geography, Sociology, and Human Development & Family Studies), this number would rise to at least the 12 (1-3 per program) active IGERTs in cohorts three and four. We anticipate a steady state of 1-3 PhD students per participant program over time.

The primary demand on the Social Data Analytics graduate faculty will be serving on doctoral committees and offering courses that are appropriate electives for Social Data Analytics PhD students. It is also expected that a typical Graduate Faculty member will participate as a guest for one session over 30 weeks of core seminars SoDA 501 and SoDA 502.12 This represents essentially no change from current demands.

The Department of Political Science and the College of Liberal Arts have committed the resources necessary to ensure the primary faculty staffing of the core seminars, SoDA 501 and SoDA 502. In collaboration with the Institute for CyberScience cluster hire, two additional faculty members (Bruce Desmarais in Political Science, Ashton Verdery in Sociology) have been hired in part to ensure these courses can be consistently staffed. (Other graduate faculty are of course welcome to propose to offer one of these core seminars.)

K. Accreditation

No accrediting body or board exists for programs of this nature and no licensing procedure is relevant.

L. Departments Affected

The primary immediate impact would be to the Department of Political Science, both as initial adopter of the program, and as administrative home of the dual-title PhD. Political Science, and the College of Liberal Arts, have committed to providing the resources necessary to sustain the program administratively and to regular offering of the core Social Data Analytics seminars, SoDA 501 and SoDA 502, and to the development of further elective courses appropriate for SoDA students. In addition to faculty already involved, the College – in association with the Institute for CyberScience – has hired new faculty with this explicit purpose in mind. Bruce Desmarais (Political Science) and Ashton Verdery (Sociology) are joining the Penn State faculty in 2015.

Five other departments (Sociology and Criminology, Human Development and Family Studies, Statistics, Geography, Information Sciences and Technology) representing six PhD programs, are likely to propose adoption of the dual-title degree within the next six months and have expressed support for this program in attached consultation. Departmental members of the graduate faculty will act as advisers and committee members in administering the degree and offer elective courses appropriate for SoDA students.

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12 See course descriptions, Appendix E.
One additional department (Computer Science and Engineering) will also have faculty acting as graduate faculty of the Social Data Analytics degree and offer elective courses appropriate for SoDA students. Due to more significant curricular incompatibilities, we do not anticipate an immediate proposal to adopt the dual title degree from this department, but do anticipate participants in the minor. Another (Industrial and Manufacturing Engineering) has one member of the Social Data Analytics graduate faculty (Conrad Tucker) and offers one course that is approved as a SoDA elective (IE 561).

This program would not duplicate any other program at Penn State. Penn State Great Valley offers a Graduate Certificate in “Data Analytics” which does not have any social science content and is not a PhD program. Director of the Data Analytics Certificate program, Colin Neill, confirms in attached consultation that Great Valley has discussed the issue, sees no conflict, and is fully supportive of the proposed dual-title program.

M. Scholarship and Research Integrity, SARI@PSU
The dual-title Ph.D. in Social Data Analytics, like all dual-titles, requires that students complete all requirements of their primary Ph.D. program. All primary Ph.D. programs have SARI@PSU training requirements and tracking systems, as required. No additional SARI@PSU training is required for the dual-title Ph.D. in Social Data Analytics.

N. Consultation
The following units have been consulted and are supportive of this dual-title degree program (see attached letters and emails, Appendix F):

- Anticipated adopting departments:
  - Department of Political Science
  - Department of Sociology and Criminology
  - Department of Human Development & Family Studies
  - Department of Geography
  - Department of Statistics
  - College of Information Sciences & Technology

- Other departments affected:
  - Department of Computer Science & Engineering
  - Department of Industrial & Manufacturing Engineering

- Other consultations requested by the Graduate School:
  - College of Engineering, referred to
    - Department of Computer Science & Engineering (see above)
    - Department of Industrial & Manufacturing Engineering
  - Penn State Great Valley, School of Professional Studies, Engineering Division (offers Graduate Certificate in Data Analytics)
  - Penn State Harrisburg, School of Public Affairs
II. Proposed Bulletin Listing

Social Data Analytics

Burt Monroe, In Charge
230 Pond Lab
814-865-9215
burtmonroe@psu.edu

Degrees Conferred

Students electing this degree program through participating programs earn a degree with a dual title at the Ph.D. level, i.e., in (graduate program name) and Social Data Analytics.

The following graduate program offers a dual degree in Social Data Analytics: Ph.D in Political Science and Social Data Analytics.

Graduate Faculty

- Duane Alwin, Ph.D. (UNIVERSITY OF WISCONSIN MADISON), McCourtney Professor of Sociology and Demography
- Clio Andris, Ph.D. (MASSACHUSETTS INSTITUTE OF TECHNOLOGY), Assistant Professor of Geography
- Le Bao, Ph.D. (UNIVERSITY OF WASHINGTON), Assistant Professor of Statistics
- Timothy R Brick, Ph.D. (UNIVERSITY OF VIRGINIA), Assistant Professor of Human Development & Family Studies
- Guoray Cai, Ph.D. (UNIVERSITY OF PITTSBURGH), Associate Professor of Information Sciences & Technology, Geography, and Computer Science & Engineering
- Donna Coffman, Ph.D. (UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL), Research Associate Professor, College of Health & Human Development
- Linda Collins, Ph.D. (UNIVERSITY OF SOUTHERN CALIFORNIA), Distinguished Professor of Human Development & Family Studies
- Christopher Fariss, Ph.D. (UNIVERSITY OF CALIFORNIA AT SAN DIEGO), Assistant Professor of Political Science
- Diane Felmlee, Ph.D. (UNIVERSITY OF WISCONSIN-MADISON), Professor of Sociology
- Glenn Firebaugh, Ph.D. (INDIANA UNIVERSITY BLOOMINGTON), Distinguished Professor of Sociology and Demography
- Christopher S Fowler, Ph.D. (UNIVERSITY OF WASHINGTON), Assistant Professor of Geography and Demography
- C Lee Giles, Ph.D. (UNIVERSITY OF ARIZONA), David Reese Professor at the College of Information Sciences & Technology; Professor of Computer Science & Engineering.
- Vasant Honavar, Ph.D. (UNIVERSITY OF WISCONSIN-MADISON), Professor and Edward Frymoyer Chair of Information Sciences & Technology and Bioinformatics and Genomics.
- Murali Haran, Ph.D. (UNIVERSITY OF MINNESOTA MINNEAPOLIS), Associate Professor of Statistics

The proposed listing is modeled after the official bulletin listings of the Dual-Title degree programs in Bioethics, Demography, Operations Research, and African Studies and shares identical language where appropriate.

This wording assumes an initial proposal to adopt from Political Science. The full language after anticipated adoptions would be “The following graduate programs offer a dual degree in Social Data Analytics: Ph.D in Political Science and Social Data Analytics; Ph.D in Sociology and Social Data Analytics; Ph.D in Criminology and Social Data Analytics; Ph.D. in Human Development and Family Studies, and Social Data Analytics; Ph.D. in Geography and Social Data Analytics; Ph.D. in Statistics and Social Data Analytics; Ph.D. in Information Sciences and Technology and Social Data Analytics.”
• Franklin A Hardisty, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Research Associate Faculty, Geography
• Melissa A Hardy, Ph.D. (INDIANA UNIVERSITY BLOOMINGTON), Distinguished Professor of Sociology, Human Development & Family Studies, and Demography
• Peter Hatemi, Ph.D. (UNIVERSITY OF NEBRASKA LINCOLN), Associate Professor of Political Science
• David R Hunter, Ph.D. (UNIVERSITY OF MICHIGAN AT ANN ARBOR), Professor of Statistics
• Luke Keele, Ph.D. (UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL), Associate Professor of Political Science
• Daniel Kifer, Ph.D. (CORNELL UNIVERSITY), Associate Professor of Computer Science & Engineering
• Alexander K Klippel, Ph.D. (UNIVERSITY OF BREMEN), Associate Professor of Geography
• Derek A Kreager, Ph.D. (UNIVERSITY OF WASHINGTON), Associate Professor of Sociology and Criminology.
• Stephanie Lanza, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Research Associate Professor, College of Health & Human Development
• Wang-Chien Lee, Ph.D. (OHIO UNIVERSITY), Associate Professor of Computer Science & Engineering
• Jia Li, Ph.D. (STANFORD UNIVERSITY), Distinguished Professor of Statistics and Computer Science & Engineering
• Runze Li, Ph.D. (UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL), Professor of Statistics and Public Health Sciences
• Zhenhui (Jessie) Li, Ph.D. (UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN), Assistant Professor of Information Sciences & Technology
• Suzanna L Linn, Ph.D. (UNIVERSITY OF IOWA), Professor of Political Science
• Eric Loken, Ph.D. (HARVARD UNIVERSITY), Research Associate Professor, College of Health & Human Development
• Alan MacEachren, Ph.D. (UNIVERSITY OF KANSAS), Professor of Geography
• Kamesh Madduri, Ph.D. (GEORGIA INSTITUTE OF TECHNOLOGY), Assistant Professor of Computer Science & Engineering
• Stephen A Matthews, Ph.D. (UNIVERSITY OF WALES), Professor of Sociology, Anthropology and Demography
• Prasenjit Mitra, Ph.D. (STANFORD UNIVERSITY), Professor of Information Sciences & Technology, and Computer Science & Engineering
• Peter Molenaar, Ph.D. (UTRECHT UNIVERSITY), Distinguished Professor of Human Development & Family Studies
• Burt L Monroe, D.Phil. (UNIVERSITY OF OXFORD), Associate Professor of Political Science, Affiliate Faculty of Information Sciences & Technology
• Xiaoyue (Maggie) Niu, Ph.D. (UNIVERSITY OF WASHINGTON), Research Associate Faculty, Statistics Zita Oravecz, Ph.D. (CATHOLIC UNIVERSITY OF LEUVEN), Assistant Professor of Human Development & Family Studies
• D Wayne Osgood, Ph.D. (UNIVERSITY OF COLORADO), Professor of Crime, Law, & Justice; and Sociology
• Donna J Peuquet, Ph.D. (SUNY AT BUFFALO), Professor of Geography
• Eric Plutzer, Ph.D. (WASHINGTON UNIVERSITY), Professor of Political Science and Sociology
• Nilam Ram, Ph.D. (UNIVERSITY OF VIRGINIA), Associate Professor, Human Development & Family Studies, and Psychology
• David Reitter, Ph.D. (UNIVERSITY OF EDINBURGH), Assistant Professor of Information Sciences & Technology
• Frank E Ritter, Ph.D. (CARNEGIE-MELLON UNIVERSITY), Professor of Information Sciences & Technology, Psychology, and Computer Science & Engineering
• Anthony C Robinson, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Research Associate Faculty, Geography
• Michael Rovine, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Professor of Human Development & Family Studies
• Philip A Schrodt, Ph.D. (INDIANA UNIVERSITY BLOOMINGTON) Professor of Political Science
• Aleksandra Slavkovic, Ph.D. (CARNEGIE MELLON UNIVERSITY) Associate Professor of Statistics and Public Health Sciences
• Andrea Tapia, Ph.D. (UNIVERSITY OF NEW MEXICO), Associate Professor of Information Sciences & Technology
• Jason Thomas, Ph.D. (UNIVERSITY OF WASHINGTON), Professor of Sociology and Demography
• Conrad Tucker, Ph.D. (UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN), Assistant Professor of SEDTAPP and Industrial Engineering
• Lingzhuo Xue, Ph.D. (UNIVERSITY OF MINNESOTA MINNEAPOLIS) Assistant Professor of Statistics
• Dashun Wang, Ph.D. (NORTHEASTERN UNIVERSITY), Assistant Professor of Information Sciences & Technology
• James Z Wang, Ph.D. (STANFORD UNIVERSITY), Professor of Information Sciences & Technology; Affiliate
The Program
The Social Data Analytics dual-title degree program is administered by the Social Data Analytics Committee, which is responsible for the management of the program. The committee maintains program definition, identifies faculty and courses appropriate to the program, and recommends policy and procedures for its operation to the Dean of the Graduate School. The program enables students from diverse graduate programs to attain and be identified with an interdisciplinary array of tools, techniques, and methodologies for social data analytics, while maintaining a close association with a home discipline. Social data analytics is the integration of social scientific, computational, informational, statistical, and visual analytic approaches to the analysis of large or complex data that arise from human interaction. To pursue a dual-title degree under this program the student must apply to the Graduate School and register through one of the approved graduate programs.

Admission Requirements
Students must apply and be admitted to the graduate program in their home department and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known on their applications to the major programs and include remarks in their statement of purpose that address the ways in which their research and professional goals in their chosen home field reflect an expanded interest in Social Data Analytics.

To be enrolled in the Dual Title Doctoral Degree Program in Social Data Analytics, a student must submit a letter of application and transcript, which will be reviewed by the Social Data Analytics Admissions Committee. An applicant must have a minimum grade point average of 3.0 (on a 4 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title degree program in Social Data Analytics prior to obtaining candidacy in their home department.

General Graduate Council admissions requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the requirements of their major doctoral program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Social Data Analytics Committee.

The minimum course work requirements for the dual-title Ph.D. degree in Social Data Analytics are as follows:
• Course work and other requirements of the primary program.
• SO DA 501\textsuperscript{15} (3 credits)
• SO DA 502\textsuperscript{16} (3 credits)
• 12 or more elective credits in Social Data Analytics from a list of courses maintained by the Social Data Analytics Committee.\textsuperscript{17} Collectively the elective credits must satisfy the following requirements:
  o (A) Core analytics distribution. 3 or more credits in courses focused on statistical learning, machine learning, data mining, or visual analytics. Courses approved as meeting this requirement are designated (A) on the list of approved electives.\textsuperscript{18}
  o (Q) Quantification distribution. 6 or more credits in courses focused on statistical inference or quantitative social science methodology. Courses approved as meeting this requirement are designated (Q) on the list of approved electives.\textsuperscript{19}
  o (C) Computational / informational distribution. 6 or more credits in courses focused on computation, collection, management, processing, or interaction with electronic data, especially at scale. Courses approved as meeting this requirement are designated (C) on the list of approved electives.\textsuperscript{20}
  o (S) Social distribution. 6 or more credits in courses with substantial content on the nature of human interaction and/or the analysis of data derived from human interaction and/or the social context or ethics or social consequences of social data analytics. Courses approved as meeting this requirement are designated (S) on the list of approved electives.\textsuperscript{21}
  o Cross-departmental distribution.
    ▪ 3 or more credits in approved courses with the prefix STAT or that of a primarily social science department.\textsuperscript{22}
    ▪ 3 or more credits in approved courses with the prefix IST, GEOG, or that of a primarily computer science or engineering department.
    ▪ 6 or more credits in approved courses outside the primary program.
    ▪ 3 or fewer credits in approved courses at the 400-level.

Students or faculty may request that the Social Data Analytics Committee consider approval of elective designations for any course, including temporary approvals for experimental or variable-title courses. Students are encouraged to take interdisciplinary courses that carry multiple (A), (Q), (C), (S).
designations, as well as to select SoDA electives that also meet requirements of the primary program. Within this framework, final course selection is determined by the student in consultation with academic advisers from their home department and Social Data Analytics.

The Social Data Analytics Program maintains a list of background and skills that it recommends students have in place by the time they begin the interdisciplinary coursework required to complete the Social Data Analytics degree.23

**Candidacy Committee Composition**

The candidacy committee must conform to all requirements of the primary program and the Graduate Council. In accordance with Graduate Council policy, the candidacy committee must include at least one member of the Social Data Analytics graduate faculty. Faculty members who hold appointments in both programs’ graduate faculty may serve in a combined role.

**Candidacy Exam**24

The dual-title degree will be guided by the Candidacy Exam procedure of the primary program and the Graduate Council. In accordance with Graduate Council policy, there will be a single candidacy examination, assessing candidacy for both primary program and the dual-title program.

**Doctoral Committee Composition**

The doctoral committee must conform to all requirements of the primary program and the Graduate Council. In accordance with Graduate Council policy, the doctoral committee shall contain at least four members. At least one of the committee members must be a faculty member on the Social Data Analytics graduate faculty. Faculty members who hold appointments in both programs’ graduate faculty may serve in a combined role. If the committee chair does not serve in this combined role, Graduate Council rules dictate that the Social Data Analytics faculty member must be designated as co-chair of the committee. If the candidate has a minor, that field must be represented on the committee by a Minor Field Member.

At least one regular member of the doctoral committee must represent a field outside the candidate’s major field of study, the “Outside Field Member.” The dual-title committee member may serve as the Outside Field Member. Additionally, the primary appointment of at least one regular member must be in an administrative unit outside the unit of primary appointment for the dissertation adviser. This committee member is referred to as the “Outside Unit Member.” The ideal arrangement then, is for a member of the Social Data Analytics graduate faculty with primary appointment in the primary program to act as dissertation chair, and for a member of the Social Data Analytics graduate faculty with primary appointment outside the administrative unit of the primary program to act as both Outside Field Member and Outside Unit Member.

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23 This is provided in Appendix E.
24 Provisions herein for committees, exams, and dissertation are exactly those governing all dual-title programs. No additional constraints have been imposed.
Comprehensive Exam
The dual-title degree will be guided by the Comprehensive Exam procedure of the primary program. After completion of required course work, doctoral candidates for the dual-title doctoral degree must pass a comprehensive examination. In programs where this includes evaluation of a written exam, the Social Data Analytics representative on the student’s doctoral committee will participate in the writing and evaluation of the exam, in accordance with procedures maintained by the primary program. In programs where the comprehensive exam involves defense of a dissertation prospectus, the Social Data Analytics representative on the student’s doctoral committee will participate in the evaluation of the prospectus, including ensuring the proposed dissertation has substantial Social Data Analytics content.

Dissertation and Dissertation Defense
Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in their home discipline and Social Data Analytics.

Social Data Analytics Doctoral Minor
Doctoral students may take a doctoral minor in Social Data Analytics. This is the appropriate option for doctoral students in programs that have not adopted the dual-title Ph.D. degree in Social Data Analytics, and for students otherwise pursuing an incompatible degree program, such as another dual-title.

As with all graduate minors, a student seeking a minor must have the approval of the student’s major program of study, the Social Data Analytics program, and the Graduate School, and official requests to add a minor to a doctoral candidate's academic record must be submitted to Graduate Enrollment Services prior to establishing the doctoral committee and prior to scheduling the comprehensive examination.

The doctoral minor in Social Data Analytics requires at least 15 credits in approved courses. Students must take SODA 501 and SODA 502, as well as 9 credits of approved electives. Additional deviations from distribution minimums and maximums may be allowed, but must be approved by the Social Data Analytics program.
Appendix A: Examples of Positions Available for SoDA Graduates

Academic Examples

Assistant Professor, Data-intensive Political Science and Statistics, Iowa State University

Iowa State University has launched the Presidential High Impact Hires Initiative to support targeted faculty hiring in areas of strategic importance. As part of this initiative, we are seeking outstanding applicants to fill a tenure-track faculty position in the Departments of Political Science and Statistics. We are especially interested in candidates who have experience with computationally intensive or data intensive techniques. These include, but are not limited to, techniques such as resampling, visualization, statistical or machine-learning, network analysis, analyses of massive amounts of text, and models for intensive spatial or longitudinal data. We are also especially interested in scholars who have the ability to collaborate with scholars and students across the university, including areas outside of the College of Liberal Arts and Sciences. We are open to scholars working on any substantive area connected to Political Science. We ask that applicants, as part of their cover letter, address how your research relates to analysis of large data.

Duties include undergraduate and graduate teaching and advising in both Political Science and Statistics, graduate student advising across the university, professional and institutional service, and developing and sustaining a high impact research program that can successfully compete for external funding.

Assistant Professor, Computational Social Science, University of Massachusetts, Amherst

The College of Social and Behavioral Sciences at the University of Massachusetts, Amherst, invites applications from social scientists within the interdisciplinary field of computational social science. This tenure track position will be in one of the following social science departments: *Anthropology, Communication, Economics, Journalism, Political Science, Regional Planning, Resource Economics, or Sociology*. The successful candidate will also participate in an outstanding interdisciplinary community represented by the Computational Social Science Institute <http://www.cssi.umass.edu> at UMass, with 43 affiliated faculty across 11 departments. Candidates’ research plans should extend beyond their home discipline to engage with other disciplines in the domain of computational sciences. Substantive foci are open and broad, including computationally intensive data collection and analysis, network structure and dynamics, relational and clustered modeling, automated mining of qualitative data, large scale textual analysis, health informatics, and theoretical computational models of social processes.

Requirements: A PhD in the social sciences is preferred but PhDs in cognate fields will be considered. We are seeking talented applicants qualified for an Assistant Professor position. Under exceptional circumstances, highly qualified candidates at other ranks may receive consideration.
Assistant Professor, Big Data Analytics Social Scientist;
College of Education and Human Ecology, Human Sciences, Ohio State University
Qualifications: Candidates must demonstrate an active research program with strong potential for external funding. The ideal candidate will also have on-going and completed research that uses innovative methods for large-scale data analysis to investigate substantive research questions. The set of possible topics ranges widely. Possible research applications range from research on how business managers can improve the processes they use to plan the menu of products or services they offer or how business managers choose to market those products/services across a network of sources/locations/industry channels; research on private and public institutions that offer mental and physical health programs and services, how managers of those organizations can improve the efficacy of programs they run that seek to improve individuals' physical and mental health; and research on how individuals, couples, and households allocate time, money, and other resources when they take life-course decisions to study, marry, divorce, consume, exercise, travel, save, and retire. The successful candidate will have scholarly interests that overlap the department’s multiple academic program areas.

Responsibilities: 40 percent research, 40 percent teaching, 20 percent service. We expect the successful candidate to actively pursue a research agenda; publish in high-impact journals; secure external research funding; teach four courses per year in our graduate or undergraduate programs; advise master’s and Ph.D. students; help improve our curriculum; and provide service to the department, college, and the university community appropriate for rank.

Assistant or Associate Professor, Data Visualization, Northern Kentucky University
This position is at the rank of assistant or associate professor and the successful candidate will support our undergraduate Data Science program, one of only three undergraduate programs in data science in the country. This position is open to candidates with a doctorate in the computational, natural, or social sciences. The home department will be determined based on the active research area of the applicant.

A successful applicant will have a demonstrated track record in using cutting-edge approaches to the visualization of large, heterogeneous, and real-time data sets in a cross-disciplinary setting. All applicants should have solid skills in statistics and computing technology in addition to a suitably deep background in their primary field of research.

Teaching responsibilities for this position will be split between the successful candidate’s home department and NKU’s Data Science program housed in the College of Informatics. The program emphasizes big data analytics, data mining, visualization, modeling, simulation and machine learning. The candidate will assist in the ongoing development of curriculum for this program and work with a multi-disciplinary team including computer scientists, statisticians and information scientists. Commitment to excellence in teaching, a continuing program of scholarship that includes engagement with undergraduates in research, and a passion for innovation and cross-disciplinary collaboration are essential.
Nonacademic examples

Data Scientist, BlueLabs (Washington, DC)

BlueLabs is a data, analytics, and technology firm formed by leadership from the Obama for America re-election campaign’s analytics team. We help organizations work smarter by leveraging innovative statistical methods and technology to make data-driven decisions in the service of good. Analytics is a fast-moving field and we are eager participants in this explosion of new ideas, new technologies, and new techniques. As we build BlueLabs from the ground up, we want to take the lessons we learned and scale them to address new, challenging problems and new opportunities for social good.

Join our team of analysts, data scientists, and software engineers as we leverage our groundbreaking technology to help identify prospective voters, donors and targets for a variety of sectors including political campaigns, nonprofits and human services providers.

Data Scientists serve as the innovation backbone of BlueLabs’ analytics division. They are responsible for creating new products, processes, and methodological tools that improve BlueLabs’ polling, predictive modeling and general analytics. They are problem solvers equipped with a variety of approaches to new problems using an assorted set of data sources. They are inquisitive, interested in learning about the problems encountered by a diverse set of organizations, and driven by creating original solutions that will bring change in the areas of most value to BlueLabs and its clients.

Responsibilities:

• To create and contribute sophisticated yet pragmatic solutions to constantly evolving analytical platform
• To help lay the foundation for the next generation of analytics
• To collaborate with other members of the BlueLabs team to implement these solutions
• To write memos and presentations for disseminating information on new products to clients

You probably have/are:

• A Master’s Degree in political science, statistics, math, economics, computer science, public policy, or quantitative field of study and 2-3 years of experience in a quantitative or analytical environment
• Comfortable working in a research environment and generating academic papers or reports on research findings
• A thinker with strong analytical and problem solving skills, high-energy, and who is self-motivated and proactive
• Experience working with large, messy datasets
• Expertise in a statistical software package such as R or STATA
• A willingness to learn new skills and concepts
• Strong attention to detail and experience leading research projects

You may have/be:

• A PhD in political science, statistics, math, economics, computer science, public policy, or quantitative field of study
• Mastery of SQL
• The ability to create automated code and user interfaces for new products
• Mastery of advanced programming functions in R, Shiny, or STATA
• Advanced training in machine learning, predictive modeling, causal inference, Bayesian methods, and other statistical techniques
• Knowledge of relational database languages, programming, and version tracking programs

Data Scientist & Statistician, Marketing Science Lab (Silicon Valley)

The Marketing Science Lab is designed to share insight with our partners by serving as a catalyst, consultant, and analyst for marketing-wide decision-support using advanced analytics. Based in EMC’s Silicon Valley Executive Briefing Center, our charter is to leverage EMC Big Data technology to support data-driven EMC marketing initiatives that provide a sustainable competitive advantage.

Brief Description of Role:
The Marketing Science Lab Data Scientist is part of a larger EMC big data analytics community and reports directly into the Director of Marketing Sciences. This position will dual report into Field Marketing and partner with Field Marketing analytical, operations and demand generation teams to support marketing in EMC’s three theaters: Americas, EMEA and APJ.

Technical/Functional Qualifications:
A MBA, MS or PhD with a focus on economics, statistics/mathematics, computer science, marketing or a related field with formal training in statistics. Excellent understanding of the application of business statistics and programming to the marketing domain.

Experience with applications for programming, manipulating and analyzing data such as:

• Massively Parallel Processing (MPP) infrastructure (i.e. Hadoop or Greenplum) using a distributed file system.
• Analytical applications such as SAS, SPSS, R or MADlib (certification a plus).
• PostgreSQL, Python/PERL and/or SAS programming experience.
• Familiarity with data visualization software such as: Tableau, SAS JMP, or R.
• Excellent Excel and PowerPoint skills
**Competency in a wide range of Analytical Techniques:**

- Experience with using techniques such as: machine-learning, ANOVA, multiple regression, cluster and association analysis.
- Understanding of the application to testing, targeting, list-scoring, segmentation, purchase recommendations.
- Use of text-mining for sentiment and term-frequency analysis.
- Time-series analysis (ARIMA etc.) for forecasting, share-of-wallet and total addressable market analysis a plus.
- Ability to integrate external third-party data sources (e.g., market research, demographic, macro-economic data) with internal transactional data in a meaningful way to model and understanding consumer behavior and their response to marketing exposure.

**Problem Solving & Communication Skills:**

- Proven ability to communicate, (both written and oral), effectively with individuals from various aspects of business, from Senior Executives to individual contributors and external business partners.
- Ability to synthesize findings and recommendations into executive-ready presentations.
- Disciplined approach to identify key performance indicators that may not currently exist in the business, especially around community and social, and report out on a regular cadence.
- Skilled at understanding high-level business questions, objectives, and needs in order to develop a thoughtful and robust analytics strategy.
- A highly creative approach to quantitative analysis and problem-solving and the ability to think outside the traditional methodologies to analyze data and render findings.
Appendix B: Selected Universities Offering Related Degrees

PhD Programs with some social sciences content
- Carnegie Mellon University: Machine Learning and Public Policy [Joint PhD]
- University of California-Berkeley: Data-Intensive Social Science [programs in development]
- University of Washington: Big Data [interdisciplinary PhD track, building from an IGERT]

PhD Programs with no necessary social sciences content
- Carnegie Mellon University: Machine Learning
- Chapman University: Computational and Data Science
- George Mason University: Computational Science and Informatics
- New York University: Computer Science w/ Specialization in Visualization, Databases, & Big Data
- New York University: Computer Science w/ Specialization in Machine Learning & Artificial Intelligence

Master’s Programs (examples)
- Central Connecticut State: Data Mining [MS]
- Cornell University: M.Eng. with Data Analytics concentration
- Columbia University: Data Science [MS, engineering but includes social science]
- New York University: Data Science [MS, includes social science]
- University of Rochester: Data Science [MS]

Certificates (examples)
- Syracuse University: Data Science [Certificate]
- University of Louisville: Data Mining [Certificate]

MS programs in Business Analytics, Business Intelligence, Predictive Analytics (examples)
- Drexel University: Business Analytics [MS]
- Louisiana State University: Analytics [MS]
- New York University: Business Analytics [MS]
- Northwestern University: Analytics [MS]; Predictive Analytics [MS]
- Notre Dame University: Predictive Analytics [MS]
- St. Joseph’s University: Business Intelligence [MS]
- Texas A&M: Analytics [MS]
- University of Texas – Austin: Business Analytics [MS]
Appendix C: Courses Approved as Social Data Analytics Electives

Approved Social Data Analytics Electives with Designation (S)

The following courses are approved as carrying at least the (S) designation without further approval required. Students or faculty may request that the Social Data Analytics Program Committee consider any additional designations for any particular version of these courses.

CRIM   500, 501, 512, 558
HDFS   501, 502, 506, 509, 520, 522, 524, 525, 528, 529, 531, 532, 533, 537, 539, 540, 544, 546, 549, 565, 569, 577, 579
PLSC   534, 540, 541, 542, 550, 551, 552, 553, 554, 555, 556, 560, 561, 563, 564, 565, 566, 586
SOC    501, 502, 512, 521, 522, 523, 524, 525, 526, 527, 528, 529, 540, 531, 532, 533, 534, 537, 538, 544, 546, 551, 553, 557, 560, 584
GEOG   501B, 501C, 520
IST     520, 521, 526

Approved Social Data Analytics Electives with Designation (Q)

The following courses are approved as carrying at least the (Q) designation without further approval required. Students or faculty may request that the Social Data Analytics Program Committee consider any additional designations for any particular version of these courses.


Approved Social Data Analytics Electives with Designation (C)

The following courses are approved as carrying at least the (C) designation without further approval required. Students or faculty may request that the Social Data Analytics Program Committee consider any additional designations for any particular version of these courses.

CSE     520, 522, 530, 531, 532, 537, 541, 542, 563, 565, 588
GEOG   501D, 560, 565, 583, 584, 585
IST     441, 510
Approved Social Data Analytics Electives with Designations (Q) and (S)

The following courses are approved as carrying at least the (Q) and (S) designations without further approval required. Students or faculty may request that the Social Data Analytics Program Committee consider any additional designations for any particular version of these courses.

CRIM 515
PLSC 501, 502, 503, 504, 505, 506, 518, 519
HDFS 503, 516, 519, 523, 526, 527, 528, 530, 534, 536
SOC 513, 515, 518, 519, 572, 573, 574, 575, 576, 577, 578, 579
STAT 507, 509

The following 597s have received temporary Q and S designations:

HDFS Person-Specific EMA (Molenaar)
HDFS Intensive Longitudinal Data (Ram)
PLSC Causal Inference (Keele)
PLSC Measurement Theory (Fariss)
SOC Causal Analysis (Firebaugh)
SOC Seminar in Longitudinal Analysis (Johnson)

Approved Social Data Analytics Electives with Designations (C) and (S)

The following courses are approved as carrying at least the (C) and (S) designations without further approval required. Students or faculty may request that the Social Data Analytics Program Committee consider any additional designations for any particular version of these courses.

GEOG 571, 588, 591
IST 530, 555

The following 597s have received temporary C and S designations:

GEOG Spatial Thinking* (Klippel)
Approved Social Data Analytics Electives with Designations (Q) and (C)

The following courses are approved as carrying at least the (Q) and (C) designations without further approval required. Students or faculty may request that the Social Data Analytics Program Committee consider any additional designations for any particular version of these courses.

STAT  540, 555, 557*, 558*, 561
CSE  550, 551, 552, 553, 554, 555, 556, 557, 560, 561*, 562, 564, 583, 585, 586
GEOG  586
IST  556, 557*, 558*, 561*, 562

The following 597s have received temporary (Q) and (C) designations:

STAT  Spatial Models (Huran)
CSE  Advanced Big Data Analytics* (Kifer)
CSE  Data-Mining and Analytics* (Lee)
CSE  Graph Mining (Madduri)
CSE  Regularity on Interdisciplinary Large Data Sets (Liu)
CSE  Vision-Based Tracking (Collins)
GEOG  Geoinformatics (Cervone)
IST  Big Data Fundamentals (Yen / Giles)
IST  Principles of Machine Learning* (Honaver)

* These courses also satisfy the core analytics requirement (A).
Approved Social Data Analytics Electives with Designations (Q), (C), and (S)

The following courses are approved as carrying (Q) (C) and (S) designations without further approval required. Students or faculty may request that the Social Data Analytics Program Committee consider any additional designations for any particular version of these courses.

The following variable title courses, 597, unless otherwise indicated, have received temporary (Q) (C) and (S) designations:

- HDFS Bayesian Methods for Human Development & Family Studies (Oravecz)
- HDFS Intro to Data Mining for Human Development & Family Studies* (Brick)
- PLSC Big Data and the Law (Zorn)
- PLSC Big Data Approaches to the Study of Political Representation (Monroe) [PLSC 551]
- PLSC Political Events Data (Schrodt)
- PLSC Robust Methods* (Honaker)
- SOC Methods of Social Network Analysis (Felmlee)
- STAT Statistical Privacy in Large Databases (Slavkovic)
- CSE Data Privacy, Learning and Statistical Analysis (Smith)
- CSE Social Network Data Analytics (Lee)
- GEOG Spatio-Temporal Analysis of Movement in Space (Andris) [GEOG 560]
- GEOG Visual Analytics: Leveraging Geo-Social Data* (MacEachren / Hardisty)
- IST Principles of Artificial Intelligence (Honaver)
- IST How the Mind Works (Reitter)
- IST Visualization and Advanced Analysis of Social Networks (Yen / Kropczynski)

* These courses also satisfy the core analytics requirement (A).
Appendix D: Sample Course Paths Through the Social Data Analytics Degree

The following examples demonstrate possible paths through the Social Data Analytics programs in a variety of fields. Where examples exist, the paths are loosely modeled on the coursework and experience of Trainees and Associates of the Big Data Social Science IGERT, revised both to reflect updated course requirements and offerings and to protect the privacy of individual students.

Note in particular that the 18-credit requirement in practice should add a maximum of 12 credits to an appropriate program path. By virtue of completing home degree requirements, and appropriate selection of internal electives, most students will need only to complete the six credits of SoDA seminars and, typically, six credits of out-department coursework to satisfy the interdisciplinary distribution requirements.
Coursework Examples, Social Science PhD student

A PhD student in Political Science, Sociology, or Human Development & Family Studies will meet the “S” and “DC1” distribution requirements as a function of fulfilling home degree requirements. A student appropriate for the Social Data Analytics dual title would also typically be pursuing the methodology option within those degrees, which also satisfy “Q” distribution requirements. Examples of two-course selections that then satisfy “A”, “C”, and “DC2” minimum distributions include:

- IST 557 (Data Mining), STAT 540 (Computational Statistics)
- STAT 557 (Data Mining), GEOG 586 (Geographic Information Analysis)
- IE 561 (Data Mining Driven Design), IST 441 (Information Retrieval)

Recent examples selected by BDSS-IGERT PhD students include:

- [Political Science student] IST 557 (Data Mining), GEOG 597 (Geoinformatics)
- [HDFS student]: HDFS 597 (Data Mining for HDFS), IST 597 (Big Data Fundamentals), STAT 597 (Statistical Privacy in Large Databases)
- [Sociology student]: GEOG 597 (Geo-social Visual Analytics), GEOG 560 (Spatio-Temporal Movement Analysis)

Coursework Examples, Statistics PhD student

A PhD student in Statistics will meet the “Q” and “DC1” distribution requirements as a function of fulfilling home degree requirements. A student appropriate for the Social Data Analytics dual title would also typically be pursuing analytics and computationally-oriented electives within those degrees, which also satisfy “A” and “C” distribution requirements, (e.g., STAT 557 Data Mining, STAT 540 Computational Statistics).

Examples of two- and three-course selections that then satisfy “S”, and “DC2” minimum distributions include:

- SOC 578 (Multilevel Regression Models), HD FS 530 (Longitudinal Structural Equation Modeling), CSE 583 (Pattern Recognition)
- SOC 579 (Spatial Demography), GEOG 560 (Spatio-temporal Analysis of Movement in Space)
- IST 558 (Data Mining II), SOC 572 (Causal Analysis), PL SC 518 (Survey Design)

Recent examples selected by BDSS-IGERT PhD students include:

- IST 557 (Data Mining), SOC 572 (Causal Analysis in the Social Sciences), STAT 597 (Statistical Privacy in Large Databases)
- GEOG 597 (Geo-social Visual Analytics), PLSC 597 (Big Data and the Law)
- GEOG 560 (Spatio-temporal Analysis of Movement in Space), SOC 597 (Methods of Social Network Analysis)
Coursework Examples, Geography PhD student

A PhD student in Geography will meet the “DC2” distribution requirements as a function of fulfilling home degree requirements. A student appropriate for the Social Data Analytics dual title would also typically be pursuing GiScience coursework that satisfies “C” distribution and could also satisfy some “S” and “Q” distributions within the Geography Department.

Examples of two-course selections that then satisfy typical remaining “S”, “Q” and “DC1” minimum distributions include:

- SOC 578 (Multilevel Regression Models), STAT 557 (Data Mining)
- PLSC 505 (Time Series Analysis), STAT 540 (Computational Statistics)
- STAT 504 (Discrete Data), SOC 572 (Causal Analysis)

Recent examples selected by BDSS-IGERT PhD students include:

- PL SC 505 (Time Series Analysis), PL SC 597 (Event Data)
- SOC 597 (Methods of Social Network Analysis), STAT 597 (Statistical Privacy in Large Databases)

Coursework Examples, Information Sciences and Technology PhD student

A PhD student in IST will meet the “DC2” and “C” distribution requirements as a function of fulfilling home degree requirements. A student appropriate for the Social Data Analytics dual title would also typically be pursuing that partially satisfies “S” and “Q” distributions within IST.

Examples of two-course selections that then satisfy typical remaining “S”, “Q” and “DC1” minimum distributions include:

- SOC 578 (Multilevel Regression Models), STAT 557 (Data Mining)
- PL SC 505 (Time Series Analysis), STAT 540 (Computational Statistics)
- STAT 504 (Discrete Data), SOC 572 (Causal Analysis)

Recent examples selected by BDSS-IGERT PhD students include:

- IST 597 (How the Mind Works), HD FS 597 (Bayesian Methods), CSE 583 (Pattern Recognition)
- SOC 597 (Methods of Social Network Analysis), STAT 597 (Statistical Privacy in Large Databases)
Appendix E: New Course Descriptions

Overview
The core seminars are organized around the metaphor used in BDSS-IGERT of the social data stack. The social data stack consists of three fuzzily boundaried layers: the “data layer,” the “analytics layer,” and the “relevance layer” (Figure 1).

![BDSS-IGERT and the Social Data Stack](image)

The data layer is comprised of the processes and technologies by which human interactions are translated into data about human interactions. This is material discussed in SoDA 501, offered in the spring semester, and typically taken in the fourth semester of the PhD.

The analytics layer is comprised of the processes and technologies by which social data are translated into knowledge about society. This is material discussed in SoDA 502, offered in the fall semester, and typically taken in the fifth semester of the PhD. (SoDA students must also take a focused seminar in a core approach to analytics: machine learning / statistical learning / data mining, or visual analytics.)

The relevance layer is comprised of the processes and technologies by which knowledge about society is translated into value for science or society. This is addressed in the SoDA seminars through a project orientation, both in evaluation and in the examples discussed with our guests throughout the courses.
**Recommended Background for Social Data Analytics Coursework**

Students will have a variety of backgrounds. Prior to beginning interdisciplinary coursework to fulfill Social Data Analytics degree requirements, including SoDA 501 and 502, students are expected to have advanced (graduate) training in at least one of the component areas of Social Data Analytics, and a familiarity with basic concepts in the others.

With regard to specialization, students are expected to have advanced (graduate) training in ONE of the following.

- (a) quantitative social science methodology and a discipline of social science (as would be the case for a second-year PhD student in Political Science, Sociology, Criminology, Human Development and Family Studies, or Demography); OR
- (b) statistics (as would be the case for a second-year PhD student in Statistics); OR
- (c) information science or informatics (as would be the case for a second-year PhD student in Information Science & Technology, or a second-year PhD student in Geography specializing in GIScience); OR
- (d) computer science (as would be the case for a second-year PhD student in Computer Science and Engineering).

This requirement is met as a matter of meeting home program requirements for students in the dual-title PhD, but may require additional coursework on the part of students in other programs wishing to pursue the graduate minor.

With regard to general preparation, students are expected to have ALL of the following technical knowledge:

- (a) basic programming skills (e.g., CMPSC 121 or equivalent); AND
- (b) basic knowledge of relational databases and/or geographic information systems (e.g., IST 210 or GEOG 160, or equivalent); AND
- (c) basic knowledge of probability, applied statistics, or social science research design (e.g., STAT 200, PLSC 309, SOC 207, or equivalent); AND
- (d) basic familiarity with a substantive or theoretical area of social science (e.g., 300-level coursework in political science, sociology, criminology, human development, psychology, economics, communication, anthropology, human geography, social informatics, or similar fields).

It is not unusual for students in to have one or more gaps in this preparation. Students must work with Social Data Analytics advisers to develop a plan for timely remediation of any deficiencies, which generally will not require formal coursework for students whose training and interests are otherwise appropriate for pursuit of the Social Data Analytics degree. Where possible this will be addressed at time of application to the Social Data Analytics program.
SODA 501, Big Social Data: Approaches & Issues
This seminar addresses the interdisciplinary integration of computational, informational, statistical, visual analytic and social scientific approaches to the creation of data that are both "social" (about, or arising from, human interactions) and “big” (of sufficient scale, variety, or complexity to strain the informational, computational, or cognitive limits of conventional social scientific approaches to data collection or analysis).

Examples include text, image, audio, video, intensive spatial &/or longitudinal data, data with complex network, hierarchical &/or other relational information, data from distributed sensors and mobile devices, digitized archival data, and data exhaust from sources like social media. Issues include sources of social data, data structures and formats for social data, data collection and manipulation technologies, data provenance, data linkage and alignment, ethics and scientific responsibility in human subjects research, experimental and observational data collection design for causal inference, sampling design, measurement of latent social concepts, reliability and validity, search and information retrieval, nonrelational and distributed databases, and standards for data preservation and sharing.

The primary objective of the seminar is substantive interdisciplinary engagement with and integration of the tools, practices, language, and standards used in the collection and management of data in the component disciplines of the Social Data Analytics field.
SODA 502, Social Data Analytics: Approaches & Issues

This seminar addresses the interdisciplinary integration of computational, informational, statistical, visual analytic and social scientific approaches to learning from data that are both "social" (about, or arising from, human interactions) and “big” (of sufficient scale, variety, or complexity to strain the informational, computational, or cognitive limits of conventional social scientific approaches to data collection or analysis).

Topics include alternative scientific models for learning from data (Bayesian inference, causal inference, statistical / machine learning, visual analytics, measurement modeling), analytics issues with big data (variable selection, parallel computing, algorithmic scaling, ensemble modeling, validation), analytics issues with particular structures and channels of social data (network data, geospatial data, intensive longitudinal data, text data), and issues of scientific responsibility and ethics in big social data.

The primary objective of the seminar is substantive interdisciplinary engagement with and integration of the tools, practices, language, and standards used to learn from data in the component disciplines of the Social Data Analytics field.
Appendix F: Departmental Letters and Emails of Support From Consultations

Units likely to propose adoption of the dual title:

College of Information Sciences and Technology

Department of Geography

Department of Sociology and Criminology (PhD in Sociology, PhD in Criminology)

Department of Statistics

Department of Human Health & Development

Units affected through offering of electives:

Department of Computer Science and Engineering

Department of Industrial & Manufacturing Engineering

Additional consultations recommended:

Engineering Division, School of Graduate Professional Studies, Penn State Great Valley

School of Public Affairs, Penn State Harrisburg
September 25, 2014

To: Lee Ann Banaszak, Head, Department of Political Science

Prof. Banaszak:

The College of Information Sciences and Technology supports the Proposal to the Graduate Council to Establish a Dual-Title Doctoral Degree Program in Social Data Analytics.

Our College is diverse in its interests, but based on the level of participation in the Big Data Social Science IGERT to date, we can anticipate a small but steady number of students would be interested in pursuing the degree if adopted by IST. Given the proliferation of iSchools that has occurred since our College’s founding, we also expect this unique program will further distinguish our doctoral program vis-à-vis our competition. This expectation is based in part on the program’s role in recruiting a current IST PhD student who serves as an IGERT Trainee, who was attracted to our doctoral program with hopes the degree will be approved in time for him.

We look forward to working with you on details associated with inclusion of IST faculty and courses, and with the possibility of a proposal from IST to adopt the dual-title degree. We expect this program will dovetail with our college’s other emerging ‘data analytics’ programs, and hence anticipate consistent offerings of courses related to the ‘core analytics’ portion of this Social Data Analytics program (e.g. IST 557 - Data Mining and others). Also, in addition to our senior faculty in this area, we have junior faculty interested in expanding the graduate courses offered in this realm.

Regards,

Carleen Maitland

An Equal Opportunity University
Department of Sociology
The Department of Sociology also houses the PhD in Criminology and the Dual-Title PhD in Demography.

To: Lee Ann Banuzak, Head, Department of Political Science,
From: John Iceland, Head, Department of Sociology and Criminology
Date: September 29, 2014
Re: Social Data Analytics Dual-title PhD Degree Program

I am pleased to offer my support for the Dual-title PhD Degree Program in Social Data Analytics. We have a number of students that may benefit from this program, and in fact, if this proposal is approved and adopted on the current timeline, one of our interested students will be eligible for the graduate minor. We have multiple faculty that could link to this program as well. We thus fully support this proposal.

[Signature]

College of the Liberal Arts
An Equal Opportunity University
Date:  April 13, 2015
To:    The Graduate School
From:  Cynthia A. Brewer, Professor and Head
Re:    Dual-title PhD program in Social Data Analytics

I am writing to express my support for the Dual Title Graduate (Ph.D.) Program as well as a graduate minor in Social Data Analytics. Geography has been an active partner (via faculty and students) in the IGERT on Big Data Social Sciences since its inauguration and is interested in being an initial partner in the associated Dual Title Graduate Program / Graduate Minor. There are manifold connections between our graduate program and the course offerings through the dual degree program that would substantially benefit our students. Interest in such a program has already been demonstrated through several IGERT students from Geography and we have current students who are keen and eligible for a dual degree in social data analytics. On the faculty level connections are straightforward as the analysis of large volumes of social data is an integral part of numerous research efforts within the Geographic Information Science option. Additionally, we expect that courses taught by our faculty would become an integral part in the dual degree program. Specifically, a course taught by Professor Alan MacEachren on “Visual Analytics: Leveraging GeoSocial Data,” a course that will be taught on a regular basis. Students enrolled in the dual-title degree will not pose an undue burden for this class and spaces will be explicitly reserved for dual-degree students. We have the expectation that with the approval of the dual degree program the geography faculty will move quickly to adopt it as well.
April 14, 2015

To: Lee Ann Banaszak, Head, Department of Political Science

Dear Professor Banaszak:

The Department of Statistics fully supports the Proposal to create a dual-title graduate (PhD) degree program and a graduate minor program in Social Data Analytics (SoDA).

Faculty and students in our department have been integrally involved in the IGERT proposal on big-data social science (BDSS) at Penn State since its inception, and we view these SoDA programs as a natural outgrowth of, and important complement to, these efforts. As further evidence of our interest, over the past several months we have been partnering with the Political Science Department, among others, in planning similar types of programs at the undergraduate level. Many of the courses that the Statistics Department offers are important requirements or options for these programs, just as the programs provide excellent chances for students in our department to expand their training into the all-important fields that these data science and data analytics programs support.

We look forward to working with the Political Science Department on the SoDA joint PhD and graduate minor programs.

Sincerely,

[Handwritten Signature]
David Hunter
Professor and Head
Department of Statistics

Eberly College of Science
9/23/2014

Burt L. Monroe, Ph.D.
Associate Professor, Political Science and Information Sciences
203 Pond Laboratories
The Pennsylvania State University
University Park, PA 16802

Dear Burt:

We are writing to indicate our support of the creation of the dual-title Ph.D. program and graduate minor in Social Data Analytics (SoDA). We believe these programs can benefit our students, and we expect that HDFS will move to adopt these programs once they are approved and following further discussions and decisions about which of our faculty will be affiliated with the programs and what HDFS methods courses can be used to satisfy program requirements. We understand that we will work with you to address these details at a later point.

Our graduate program admits students each year with strong interests in developmental methods and data analysis. Thus we anticipate that we will have a steady stream of students who will be interested in pursuing the dual degree and graduate minor programs.

We wish you success in this effort and look forward to next steps.

Sincerely,

Douglas M. Teti, Ph.D.
Professor of Human Development, Psychology, and Pediatrics
Head, Human Development and Family Studies

Eva S. Lefkowitz, Ph.D.
Professor-in-Charge, HDFS Graduate Program
Hi Ann,

I had hoped to receive more input from faculty, but think I have received all that I am going to get at this point.

Here is a summary of the comments brought forward:

Several colleagues commented that CSE offers several courses that may be relevant to this program in addition to the ones you have listed (you listed two courses - CSE 583/EE 552 - Pattern Recognition, and CSE 597B Advanced Big Data Analytics). The additional courses would include CmpSc 448 (Machine Learning & Algorithmic AI), at the graduate level we have a new course CSE 584 Machine Learning: Tools & Algorithms - which has been approved by the college and is heading to the Grad School review committee (it has been offered for several years as a 597, but you would not have known about this course probably), several 597's this semester, CSE 597D - Data Mining Driven Design, CSE 597F - Social Network Data Analytics, CSE 597I - Data Privacy, Learning and Statistical Analysis, and CSE 597K - Theoretical, Computational and Experimental Regularity on Interdisciplinary Large Data Sets. A few other courses that some faculty mentioned which may be of interest to some of your students would include CmpSc 431W - Database Management Systems, CSE 586/EE 554 - Topics in computer vision, and perhaps the 400 level course, CmpEn/EE 454 Fundamentals of Computer Vision, and CSE 585/ EE 555 - Digital Image Processing II and perhaps the corresponding 400 level course, CmpEn/EE 455 - Digital Image Processing.

One of the faculty said that he is collaborating with social science researchers and has encountered problems where elements of big data analytics, pattern recognition, graduate machine learning, social network analysis, computer vision, digital image processing and several of this semester's 597's were useful for their work.

There was some concern though that students in the new dual-title program might not have sufficient technical background, particularly programming, to take some of these courses. CSE 597B - Advanced Big Data Analytics in particular was mentioned - but the question was raised in regards to some of the other courses as well.

Those were the specific comments, in general those faculty I talked to saw no issues of concern with the program in general.

I hope this is helpful.
Lee

Note that we do not anticipate the (imminent) adoption of the dual title PhD from CSE. There are, however, a number of CSE faculty who have been active in BDSS-IGERT and other SoDA-related activities, as well as CSE and CMP SC courses that are approved for various SoDA elective requirements. In addition, CSE PhD students have expressed interest in the Social Data Analytics minor. (The referenced faculty comment about sufficient technical background reflects a confusion about the elective role of particular courses, as well as the reality that BDSS-IGERT PhD students [from IST, Statistics, Political Science, and Geography] have successfully completed several of the courses in question. Also, CSE PhD students who wish to pursue the minor will be among the audience for these classes. In no case would a faculty member need to accept a student into a course with insufficient prerequisites or preparation.) This version of the proposal details the exact elective role of particular courses.
Greetings Lee Ann, and Happy New Year!

We are happy to endorse this effort. We may also have a few PhD students who might be interested in the program. We need to learn how to enter our responses into the consulting system and will get this to you asap.

I’m pleased to let you know that Paul Humphreys joined our department yesterday (bio below). He can help with this process.

Cheers,

Harriet
Great Valley has a program in “Data Analytics.”

Hi Lee Ann:

The Engineering Division at the School of Graduate Professional Studies has reviewed and discussed the proposal. We have no objection to the program and fully support the initiative.

Good luck with your proposal,

Regards,

Colin Neill

Dr. Colin J. Neill
Director of Engineering Programs
Associate Professor of Software & Systems Engineering
School of Graduate Professional Studies
Penn State University

www.personal.psu.edu/cjn6
This is an excellent idea. The concept of providing this for students in traditional social science and related disciplines to provide more powerful training in data analytics makes a great deal of sense. A number of solid points: many of the courses exist; enrollments in such courses have been solid to outstanding; the totality of courses provides considerable flexibility to students in tailoring the courses to their own needs/interests. Students from a number of disciplines (as noted in the proposal) would find this of value. It would also put Penn State among leaders in this arena.

In short, I am enthusiastic about this initiative.

Steven A. Peterson
Director, School of Public Affairs
Penn State Harrisburg
777 W. Harrisburg Pike
Middletown, PA 17057

Phone: 717-948-6154
E-mail: sap12@psu.edu

Dear Lee Ann and colleagues,

I have read the proposal for the dual-degree program with pleasure. I support your proposal enthusiastically. I will be glad to write a letter of support if you need one from me.

Please see attached my comments on the proposal and some suggestions. I hope these comments and suggestions will be helpful to you. If you have any questions about any of them, please let me know.

Goktug Morcol
School of Public Affairs
Penn State Harrisburg
Webpage: http://www.personal.psu.edu/gxm27/
Graduate Council
Program, Option, or Minor Proposal Form

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Curriculum Coordinator, University Faculty Senate, 101 Kern Graduate Building, University Park. The proposals will be transmitted to the Office of the Dean of the Graduate School for entry into the Graduate Council curricular review process; for more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

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- [ ] Second semester following approval

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New designation of existing graduate program (if changing):
New designation of existing graduate option (if changing):
New designation of existing graduate minor (if changing):

Brief description of the change (if not noted above): adoption of newly proposed Social Data Analytics Dual-title Program

Indicate effective semester:

- [x] First semester following approval
- [ ] Second semester following approval

Submitted by Graduate Program Head

Lee Ann Banaszak

Signature

Date: 4/15/15

Noted by College/School Representative to Graduate Council Subcommittee on New and Revised Programs and Courses:

Jennifer Wagner-Lawler

Signature

Date: 4/15/15

Approved by College/School Dean/Chancellor (or Designee):

Eric Silver

Signature

Date: 4/15/15
Recommended by Chair, Graduate Council Subcommittee on New and Revised Programs and Courses:

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Recommended by Chair, Graduate Council Committee on Programs and Courses:

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Noted by Dean of the Graduate School:

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A Proposal to Graduate Council to Adopt the
Dual-Title Doctoral Degree Program in
Social Data Analytics

Submitted by
Department of Political Science

Contact:
Lee Ann Banaszak
Head, Department of Political Science
Pond Laboratory 219
814-865-7515
lab14@psu.edu
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I. Overview

The graduate program in Political Science proposes to adopt the proposed dual-title Ph.D. degree program in Social Data Analytics.

II. Justification for the Dual-Title Ph.D. in Political Science and Social Data Analytics

In response to ubiquitous and massive new sources of data, data science and analytics are emerging as new trans-disciplinary fields of inquiry, merging statistics, computer science, and visual analytics. Perhaps the greatest challenges and opportunities arise in particular from socially-generated big data, observed as a result of human interaction. As contemporary interactions become increasingly instrumented, recorded via web, mobile device, and distributed sensors, and as historic interactions become more easily quantifiable through digitization and sharing of document and image archives, society faces a transformative and disruptive data deluge, from which new scientific, economic, and social value can be extracted.

Big and complex social data challenge existing research models in the social sciences, in the computational and information sciences, and in the sciences of statistics and visualization. The scale and complexity of data has begun to overtake the capabilities of hardware, algorithms, and research designs of conventional social science, forcing us to reconfigure ourselves to face a new world of data-intensive social science. Conversely, the practices, concerns, and standards of statistics and social science methodology – reliability, validity, uncertainty, causality, ethics of human subjects research – challenge emerging practices in the new fields of data science and data analytics. As a result, big and complex social data overwhelm current disciplinary Ph.D. training models.

In 2009, the Penn State Quantitative Social Science Initiative, centered in the Department of Political Science, began discussions with faculty across Penn State about mechanisms for leveraging existing and emerging strengths in component disciplines to develop an interdisciplinary training model to meet these challenges. This culminated in 2012 with the awarding of a $3 million grant from the National Science Foundation’s Integrative Graduate Education and Research Traineeship (IGERT) program (which has received further support totaling over $2 million from the College of Liberal Arts, the College of Human Health & Development, the College of Information Sciences & Technology, the College of Sciences, the College of Earth & Mineral Sciences, the College of Engineering, the Social Science Research Institute, the Institute for CyberScience, and the Office of the Vice President for Research) to develop a new model for interdisciplinary Ph.D. training in “Big Data Social Science,” to be instantiated in a new dual-title Ph.D. program in “Social Data Analytics.”

1 The IGERT (and now National Research Traineeship - NRT) programs are highly competitive and an explicit strategic target of
Since 2012, the Big Data Social Science IGERT (BDSS-IGERT) has funded three cohorts totaling 19 Ph.D. students, and selected a fourth cohort of six Ph.D. students – in Political Science, Human Development & Family Studies, Sociology, Demography, Statistics, Geography, and Information Sciences & Technology – for two-year traineeships involving research rotations, collaborative research projects, externships, and a transitional curriculum in Social Data Analytics. The proposed degree is as developed, refined, and detailed in the multiyear IGERT proposal process, and as refined through the experience of the first three years of BDSS-IGERT.

A unique and defining feature of the proposed Social Data Analytics dual-title Ph.D. degree program, within the current explosion of programs in “data science,” “analytics,” “big data,” and similar areas, is the focus on integration of a social science orientation to the field of study. We distinguish this, sharply, from the usual characterization of social science as a “domain” of data science, and characterize social scientific thinking as a core pillar of Social Data Analytics.

Further, the multidisciplinary, comparative intellectual vision of the proposed Dual-Title Doctoral Degree Program in Social Data Analytics is fundamental to the mission of Penn State’s College of the Liberal Arts (CLA), as enunciated in the College’s Strategic Plan for 2014-2019, titled “Excellence for the 21st Century.” In this document, CLA makes the following commitment to the development of new and exciting intellectual programs, including dual-title doctoral degree programs:

“Drawing on our past success with innovative dual-title Ph.D. programs, we will continue to invest strategically in new interdisciplinary dual-title programs. Specifically, we will continue to provide substantial support for our NSF-funded big data social science IGERT graduate training program, which spans several disciplines and colleges. We aim to develop a dual-title Ph.D. program in Social Data Analytics and create an undergraduate degree and MPS in social data analytics both in-residence and online.”

Despite the push for training in the field of Big Data and Social Science, only a few cohesive doctoral level programs exist to date and most do not provide multidisciplinary degrees: Stanford’s Social Data Lab and Harvard’s Institute for Quantitative Social Science are great examples of sites for big data research in the social sciences, but do not offer doctoral programs. Most of the programs available are master’s degree programs and few, if any, focus on big data in the social sciences. Anecdotal evidence of extensive interest in this type of program is found in the queries, calls and emails received from students, directors of graduate studies and other faculty since the announcement of the Big Data Social Science IGERT award at Penn State in September 2012. The proposed dual-title program will leverage the collaborative relationships, activities and funding established within the ongoing IGERT program as a foundation on which to build a program for the study of big data integrating a social science orientation. Owing to its uniqueness, the proposed program provides an academic niche, which will contribute to Penn State’s vision of becoming a leader in multidisciplinary, international, and multicultural scholarship.
Moreover, we aim not only to place graduates in highly competitive academic positions to lead this new science, but also to demonstrate the relevance of Ph.D. training for some portion of those nonacademic positions in “deep analytics.” This is a particularly disruptive way to think of Ph.D. education in the social sciences, where academic employment has been the primary focus.

For students in Political Science, the Social Data Analytics dual-title offers an intellectual home that integrates political methodology with interdisciplinary approaches to big data and analytics arising from computational, informational, statistical, visual analytic sciences, as well as other social sciences.

In summary, the proposed dual-title Ph.D. in Political Science and Social Data Analytics will:

- Provide a cohesive curriculum for in-depth training in political science sufficient to succeed in that discipline, and a breadth of training across computational, informational, statistical, and visual analytic sciences, sufficient to lead in the emerging field of social data analytics.
- Train Political Science Ph.D.s who expand the capabilities of social data analytics, and use those capabilities creatively to answer important social scientific questions and to address grand social challenges.
- Supply, to both the academic and nonacademic markets, Political Science Ph.D.s whose training leads them to instinctively consider diverse and multinational perspectives on social data issues, to instinctively and effectively prioritize ethics, scientific responsibility, and social consequences in the creation and use of social data, and to communicate effectively with both scientific and nonscientific audiences.

III. Description of Required Social Data Analytics Course work

A. General Course work Requirements in the Dual-Title Ph.D. program in Social Data Analytics

The minimum course work requirements for the dual-title Ph.D. degree in Social Data Analytics are as follows:

- Course work and other requirements of the primary program.
- SO DA 501\(^3\) (3 credits)
- SO DA 502\(^4\) (3 credits)
- 12 or more elective credits in Social Data Analytics from a list of courses maintained by the Social Data Analytics Committee.\(^5\) Collectively the elective credits must satisfy the following requirements:
  - (A) Core analytics distribution. 3 or more credits in courses focused on statistical learning, machine learning, data mining, or visual analytics. Courses approved as meeting this requirement are designated (A) on the list of approved electives.\(^6\)

---

\(^3\) SODA 501 has been proposed as a permanent course and is under review. A course description is provided in Appendix B.

\(^4\) SODA 502 has been proposed as a permanent course and is under review. A course description is provided in Appendix B.

\(^5\) The current version of this document is included as Appendix A.

\(^6\) Approved courses designated (A) include IST 557, 558, 561; STAT 557, 558; CMPSC 448; CSE 584, 561; IE 561. See Appendix A. for details.
(Q) Quantification distribution. 6 or more credits in courses focused on statistical inference or quantitative social science methodology. Courses approved as meeting this requirement are designated (Q) on the list of approved electives.  

(C) Computational / informational distribution. 6 or more credits in courses focused on computation, collection, management, processing, or interaction with electronic data, especially at scale. Courses approved as meeting this requirement are designated (C) on the list of approved electives.  

(S) Social distribution. 6 or more credits in courses with substantial content on the nature of human interaction and/or the analysis of data derived from human interaction and/or the social context or ethics or social consequences of social data analytics. Courses approved as meeting this requirement are designated (S) on the list of approved electives.  

Cross-departmental distribution.  
- 3 or more credits in approved courses with the prefix STAT or that of a primarily social science department.  
- 3 or more credits in approved courses with the prefix IST, GEOG, or that of a primarily computer science or engineering department.  
- 6 or more credits in approved courses outside the primary program.  
- 3 or fewer credits in approved courses at the 400-level.

Students or faculty may request that the Social Data Analytics Committee consider approval of elective designations for any course, including temporary approvals for experimental or variable-title courses. Students are encouraged to take interdisciplinary courses that carry multiple (A), (Q), (C), (S) designations, as well as to select SO DA electives that also meet requirements of the primary program. Within this framework, final course selection is determined by the student in consultation with academic advisers from their home department and Social Data Analytics.

Through satisfaction of home degree requirements, and appropriate choice of electives to satisfy multiple criteria, students may satisfy these requirements with as few as 12 credits outside their home program (SO DA 501, SO DA 502, and 6 credits of appropriate interdisciplinary electives). In particular, students are encouraged to take courses carrying multiple AQCS designations. Table 1 provides illustrative examples of courses with multiple AQCS designations. A complete current listing is provided in Appendix A. (There is no formal maximum number of credits from the primary degree that can be double-counted toward the SO DA degree. For those meeting the SO DA elective requirement with the minimum of 12 credits, the outside-program minimum effectively limits the number of primary degree

---

7 Approved courses designated (Q) include most 500-level courses or above carrying the prefix STAT, most social science methodology courses (including CRIM 515; PL SC 501, 502, 503, 504, 505, 506, 518, 519; HD FS 503, 516, 519, 523, 526, 527, 528, 530, 534, 536; SOC 513, 515, 518, 519, 572, 573, 574, 575, 576, 577, 578, 579), as well as CMPSC 448; CSE 550, 551, 552, 553, 554, 555, 556, 557, 560, 561, 562, 564, 583, 584, 585, 586; GEOG 586; IE 561; IST 556, 557, 558, 561, 562. See Appendix A for details.

8 Approved courses designated (C) include CMPSC 431W, 448, 454; CSE 520, 522, 530, 531, 532, 537, 541, 542, 550, 551, 552, 553, 554, 555, 556, 557, 560, 561, 562, 563, 564, 565, 583, 584, 585, 586, 588; GEOG 501D, 506, 565, 571, 583, 584, 585, 586, 588; I E 561; IST 441, 510, 520, 521, 526, 530, 555, 556, 557, 558, 562. See Appendix A for details.

9 Approved courses designated (S) include most courses at the 500-level or above carrying one of the prefixes CRIM, DEMOG, HD FS, PL SC, SOC, as well as GEOG 501B, 501C, 520, 571, 588, 591; IST 520, 521, 526, 530, 555; STAT 507, 509. See Appendix A for details.

10 This includes any approved course with a prefix CRIM, DEMOG, PL SC, SOC, or HD FS.
credits that count toward SO DA at 6. Adopting programs and advising committees may limit the number of credits taken for the SO DA degree that can count toward home degree requirements.

Please note that while many of the courses selected are experimental (597, in particular), none of these is a required course. Only SO DA 501 and SO DA 502 must be accepted and provided as permanent courses to ensure students can progress efficiently through the degree.)
Table 1: Examples of 500-Level Courses Carrying Multiple AQCS Designations

<table>
<thead>
<tr>
<th>Department/#</th>
<th>Course Title</th>
<th>A</th>
<th>Q</th>
<th>C</th>
<th>S</th>
<th>DC1</th>
<th>DC2</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 557/558</td>
<td>Data Mining I / II</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT 557/558</td>
<td>Data Mining I / II</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 597</td>
<td>Visual Analytics using Geo-Social Data (MacEachren)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD FS 597</td>
<td>Intro to Data Mining for Human Development (Brick)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I E 561</td>
<td>Data Mining Driven Design</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSE 597</td>
<td>Advanced Big Data Analytics (Kifer)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 597</td>
<td>Visualization &amp; Adv Analysis of Social Networks (Yen)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 597</td>
<td>Spatio-Temporal Movement Analysis (Andris)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD FS 597</td>
<td>Bayesian Meth for Human Dev &amp; Fam Stud (Oravec)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL SC 597</td>
<td>Event Data Analysis (Schrodt)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSE 597</td>
<td>Data Privacy, Learning, and Statistical Analysis (Kifer)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT 597</td>
<td>Privacy in Large Statistical Databases (Slavkovic)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC 597</td>
<td>Methods of Social Network Analysis (Felmlee)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 560</td>
<td>Seminar in Geographic Information Science</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 555</td>
<td>Intelligent Agents and Distributed Decision Making</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL SC 551</td>
<td>Comparative Political Institutions</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSE 583/</td>
<td>Pattern Recognition—Principles and Applications</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E E 552</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSE 586</td>
<td>Topics in Computer Vision</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT 540</td>
<td>Statistical Computing</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 586</td>
<td>Geographical Information Analysis</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 556</td>
<td>Web Analytics: Research Approaches for Online Data</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 597</td>
<td>Big Data Fundamentals (Giles / Yen)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD FS 530</td>
<td>Longitudinal Structural Equation Modeling</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL SC 505</td>
<td>Time Series Analysis in Political Science</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL SC 518</td>
<td>Survey Methods I: Survey Design</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL SC 597</td>
<td>Measurement Theory (Fariss)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL SC 597</td>
<td>Causal Inference (Keele)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC 578</td>
<td>Multilevel Regression Models</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC 579</td>
<td>Spatial Demography</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT 507</td>
<td>Epidemiologic Research Methods</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS 580</td>
<td>Elements of Network Science and Its Applications</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These are illustrative examples. A complete listing of approved courses and designations is provided in Appendix C.
B. Course work Requirements, Dual-Title Ph.D. in Political Science and Social Data Analytics

The following provides a side-by-side summary of how Social Data Analytics course work requirements interact with Political Science course work requirements in the dual-title Ph.D. in Political Science and Social Data Analytics.

<table>
<thead>
<tr>
<th>Table 2. Comparison of Course work Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ph.D. in Political Science</strong></td>
</tr>
<tr>
<td><strong>Ph.D. in Political Science &amp; Social Data Analytics</strong></td>
</tr>
<tr>
<td><strong>Total credits</strong></td>
</tr>
<tr>
<td>A minimum of 60 postbaccalaureate credits of course work.</td>
</tr>
<tr>
<td><strong>Field Distribution</strong></td>
</tr>
<tr>
<td>Completion of course work in one major field in Political Science and two minor fields (one of which must be in Political Science), as outlined in the graduate student handbook.</td>
</tr>
<tr>
<td>- PL SC Major field (15 credits)</td>
</tr>
<tr>
<td>- Must include field seminar.</td>
</tr>
<tr>
<td>- PL SC First minor field (9 credits)</td>
</tr>
<tr>
<td>- Must include field seminar.</td>
</tr>
<tr>
<td>- Second minor field (9 credits)</td>
</tr>
<tr>
<td>- Must include field seminar if taken in a designated PL SC field.</td>
</tr>
</tbody>
</table>

*Designated fields are American politics, comparative politics, international relations, and political methodology.*

| **Field Distribution**                        |
| Completion of course work in a first major field in Political Science, a first minor field in Social Data Analytics, and a minor field in Political Science, as outlined in the graduate student handbook. |
| - PL SC major field (15 credits)              |
|   - Must include field seminar. |
| - SO DA minor field (9 credits)               |
|   - SO DA 501, SO DA 502, non-PL SC SO DA elective |
| - PL SC minor field (9 credits)               |
|   - Must include field seminar. |

9 credits of the 18 required for SO DA (SO DA 501, 502, and 3 out-department credits) are attributed internally within political science to the SO DA “minor field.” This is established practice within dual-title programs in Political Science.

| **Required methods course work**              |
| - PL SC 501 (3 cr)                            |
| - PL SC 502 (3 cr)                            |
| - PL SC 503 (3 cr)                            |

*These also satisfy certain SO DA distribution requirements.*

| **Professional development seminars**         |
|                                            |
|                                            |

<p>| <strong>Professional development seminars</strong>         |
|                                            |
|                                            |</p>
<table>
<thead>
<tr>
<th>Required Social Data Analytics core seminars</th>
</tr>
</thead>
</table>
| - SO DA 501 (3 credits)  
| - SO DA 502 (3 credits) |

<table>
<thead>
<tr>
<th>SO DA-approved distribution electives</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 or more credits in approved courses, collectively meeting the following distribution requirements:</td>
</tr>
</tbody>
</table>
| - A: Analytics (3+ cr)  
| - Q: Quantification (6+ cr)*  
| - C: Computational/informational (6+ cr)  
| - S: Social (6+ cr)*  
| - 6 or more credits outside PL SC  
| - 3 or more credits in disciplinary cluster 1: STAT or social science*  
| - 3 or more credits in disciplinary cluster 2: IST, GEOG, CSE, CMPSC or engineering  
| - 3 or fewer credits at the 400-level. |

* The Q, S, and social science elective requirements are fulfilled by the methods sequence courses in the Political Science Ph.D..

The remaining requirements can be met by as few as 6 credits (two courses), as long as one course is in the GEOG/IST/Engineering cluster, the other is outside PL SC, both carry the C designation, and one carries the A designation. Examples of such pairs:

- IST 557 (Data Mining: Techniques and Applications) & STAT 540 (Statistical Computing)  
- STAT 557 (Data Mining: Techniques and Applications) & GEOG 560 (Seminar in Geographic Information Science)  
- I E 561 (Data Mining Driven Design) & CSE 583 (Pattern Recognition—Principles and Applications)
Communication & foreign language requirements
May be satisfied by advanced course work and competence developed in foreign languages, statistics, or other research methods.

Completion of course work that meets SO DA requirements also satisfies the research methods criteria of this requirement.

Scholarship and Research Integrity
SARI@PSU requirement is fulfilled through PL SC 511, departmental brownbags, ORP workshops, and certification of CITI course completion.

C. Example Course work Path, Dual-Title Ph.D. in Political Science and Social Data Analytics

Table 3 illustrates an example path through course work and other milestone requirements of the dual-title Ph.D. in Political Science. It is modeled on course paths actually taken by Political Science Ph.D. students in BDSS-IGERT. (In practice, all BDSS-IGERT students have taken a variety of variable title 597 courses on cutting edge topics – see Table 1 and Appendix A – but other than SO DA 501 and 502, the viability of the dual degree in no way depends on the permanent conversion of any particular experimental course.)

Table 3. Example Path Through Dual-Title Ph.D.

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Department/#</th>
<th>Course Title</th>
<th>A</th>
<th>Q</th>
<th>C</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>PL SC 501</td>
<td>Methods of Political Analysis</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>PL SC 502</td>
<td>Statistical Methods for Political Research</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>PL SC 560</td>
<td>International Relations: Theory and Methodology</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>PL SC 503</td>
<td>Multivariate Analysis for Political Research</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>PL SC 566</td>
<td>Conflict Management, Termination, and Bargaining</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>PL SC 565</td>
<td>International Conflict</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Year 1</td>
<td>PL SC 511</td>
<td>Professional Norms in Political Science (1.5 credits)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Year 2

<table>
<thead>
<tr>
<th>Department/#</th>
<th>Course Title</th>
<th>A</th>
<th>Q</th>
<th>C</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL SC 504</td>
<td>Topics in Political Methodology</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IST 557</td>
<td>Data Mining: Techniques and Applications</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>STAT 540</td>
<td>Statistical Computing</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL SC 563</td>
<td>International Political Economy</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SO DA 501</td>
<td>Big Social Data: Approaches and Issues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL SC 505</td>
<td>Time Series Analysis in Political Science</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL SC 561</td>
<td>American Foreign Policy</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

*M.A. Thesis defense - End of Semester 4*

### Year 3

<table>
<thead>
<tr>
<th>Department/#</th>
<th>Course Title</th>
<th>A</th>
<th>Q</th>
<th>C</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO DA 502</td>
<td>Social Data Analytics: Approaches and Issues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 560</td>
<td>Seminar in Geographic Information Science</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL SC 518</td>
<td>Survey Methods I: Survey Design</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL SC 513</td>
<td>Writing and Professional Development in Political Science (1.5 credits)</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

*Written qualifying exams: Start of Semester 6*

*Oral comprehensive exams: End of Semester 6*

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>27</td>
<td>9</td>
<td>33</td>
</tr>
</tbody>
</table>

This example satisfies political science course requirements:

- Required courses (12 cr): PL SC 501, 502, 503, 511, 513
- Major field in International Relations (15 cr): PL SC 560, 561, 563, 565, 566
- Minor field Social Data Analytics (9cr): SO DA 501, SO DA 502, IST 557
- Minor field in Political Methodology (9cr): PL SC 504, 505, 518

This example satisfies Social Data Analytics course requirements:

- Required courses (6 cr): SO DA 501, 502
- SO DA-approved electives (42 cr > 12 cr): All courses marked A, Q, C, or S in Table 3.
- Analytics distribution (3 cr): IST 557
- Quantification distribution (27cr > 6cr): Five PL SC courses, STAT 540, IST 557, GEOG 560
- Computational / informational distribution (9 cr > 6 cr): IST 557, STAT 540, GEOG 560
- Social distribution (33 cr > 6 cr): 11 PL SC courses.
- Disciplinary cluster 1 (STAT / Social Science) (36 cr > 3 cr): 11 PL SC courses, STAT 540
- Disciplinary cluster 2 (IST / GEOG / Engineering) (6 cr > 3cr): IST 557, GEOG 560
• Out-program distribution (non-PL SC) (9 cr > 6cr): STAT 540, IST 557, GEOG 560
IV. Additional Requirements, Dual-Title Ph.D. in Social Data Analytics

The following provides a side-by-side summary of how additional Social Data Analytics requirements compare to and interact with Political Science requirements in the dual-title Ph.D. in Political Science and Social Data Analytics.

### Table 4. Comparison of Other Requirements

<table>
<thead>
<tr>
<th>Ph.D. in Political Science</th>
<th>Ph.D. in Political Science &amp; Social Data Analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Candidacy Committee</strong></td>
<td><strong>Candidacy Committee</strong></td>
</tr>
<tr>
<td>Prior to candidacy exam/session, student must put together a candidacy committee consisting of the student’s adviser, the Graduate Director or another faculty member from the Graduate Studies Committee, and one other faculty member with whom the student has taken or is taking a seminar. Students in dual degree programs must include these faculty from Political Science, as well as at least one faculty member from their dual program.</td>
<td>Prior to candidacy exam/session, student must put together a candidacy committee consisting of the student’s adviser, the Graduate Director or another faculty member from the Graduate Studies Committee, and one other faculty member with whom the student has taken or is taking a seminar. If none of these is also a member of the Graduate Faculty in SO DA, the committee must also include an additional member who as a representative of the SO DA faculty. The SO DA representative may be from outside Political Science. If the adviser is not a member of the SO DA graduate faculty, the SO DA representative on the committee will also act as co-chair. <em>This is established practice in dual-title programs.</em> <em>Given the multiple joint members of the graduate faculty in Political Science and Social Data Analytics, this will only rarely lead to expanded committees.</em></td>
</tr>
<tr>
<td><strong>Candidacy Exam / Session</strong></td>
<td><strong>Candidacy Exam / Session</strong></td>
</tr>
<tr>
<td>Held at the end of the spring semester of the first year.</td>
<td>Held at the end of the spring semester of the first year. Because of expanded requirements, Graduate Council allows for the possibility of delaying the candidacy exam by one semester for dual-title students. <em>This is established practice in dual-title programs.</em></td>
</tr>
</tbody>
</table>
## Doctoral Committee

The doctoral committee consists of four or more active members of the Graduate Faculty, including at least two faculty members in the major field. The dissertation adviser must be a member of the doctoral committee. At least one regular member of the doctoral committee must represent a field outside the candidate’s major field of study in order to provide a broader range of disciplinary perspectives and expertise. This committee member is referred to as the “Outside Field Member.” Additionally, in order to avoid potential conflicts of interest, the primary appointment of at least one regular member of the doctoral committee must be in an administrative unit that is outside the unit in which the dissertation adviser’s primary appointment is held. This committee member is referred to as the “Outside Unit Member.”

## Doctoral Committee

The doctoral committee must conform to all requirements of the primary program and the Graduate Council. In accordance with Graduate Council requirements, the doctoral committee shall contain at least four members. At least one of the committee members must be a faculty member on the Social Data Analytics graduate faculty. Faculty members who hold appointments in both programs’ graduate faculty may serve in a combined role. If the committee chair does not serve in this combined role, Graduate Council rules dictate that the Social Data Analytics faculty member must be designated as co-chair of the committee.

At least one regular member of the doctoral committee must represent a field outside the candidate’s major field of study, the “Outside Field Member.” The dual-title committee member may serve as the Outside Field Member. Additionally, the primary appointment of at least one regular member must be in an administrative unit outside the unit of primary appointment for the dissertation adviser. This committee member is referred to as the “Outside Unit Member.” The ideal arrangement then, is for a member of the Social Data Analytics graduate faculty with primary appointment in the primary program to act as dissertation chair, and for a member of the Social Data Analytics graduate faculty with primary appointment outside the administrative unit of the primary program to act as both Outside Field Member and Outside Unit Member.

This matches Graduate Council requirements and established practice in dual-title programs within Political Science.
<table>
<thead>
<tr>
<th>Oral Comprehensive Exam</th>
<th>Oral Comprehensive Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>The oral comprehensive exam must follow the written qualifying exam within the same semester. The oral comprehensive examination is administered by the doctoral committee. The examination focuses on the dissertation prospectus, as well as the student’s preparation to undertake dissertation research.</td>
<td>The oral comprehensive exam must follow the written qualifying exam within the same semester. The oral comprehensive examination is administered by the doctoral committee. The examination focuses on the dissertation prospectus, as well as the student’s preparation to undertake dissertation research.</td>
</tr>
<tr>
<td>The dissertation prospectus must contain substantial Social Data Analytics content.</td>
<td>The dissertation prospectus must contain substantial Social Data Analytics content.</td>
</tr>
<tr>
<td><em>This is established practice in dual-title programs.</em></td>
<td><em>This is established practice in dual-title programs.</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dissertation Proposal</th>
<th>Dissertation Proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within six months of passing the oral comprehensive examination, a student must submit to the Director of Graduate Studies a detailed dissertation proposal approved by the members of the student’s doctoral committee. In a few cases, the dissertation prospectus may satisfy this requirement.</td>
<td>Within six months of passing the oral comprehensive examination, a student must submit to the Director of Graduate Studies a detailed dissertation proposal approved by the members of the student’s doctoral committee. In a few cases, the dissertation prospectus may satisfy this requirement.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dissertation Defense</th>
<th>Dissertation Defense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon completion of the doctoral dissertation, the candidate must pass an oral examination (the dissertation defense) to earn the Ph.D. degree. The oral examination is administered by the doctoral committee.</td>
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<td><em>This is established practice in dual-title programs.</em></td>
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*This is established practice in dual-title programs.*
V. Proposed Amendment to Graduate Bulletin for Political Science (PL SC) (with changes tracked)

Political Science (PL SC)

Program Home Page

LEE ANN BANASZAK, Head of the Department
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Degrees Conferred:

Ph.D., M.A.
Dual-Title Graduate Degree (Ph.D.) in Political Science and African Studies
Dual-Title Graduate Degree (Ph.D.) in Political Science and Asian Studies
Dual-Title Graduate Degree (Ph.D.) in Political Science and Social Data Analytics
Dual-Title Graduate Degree (Ph.D.) in Political Science and Women's Studies

The Graduate Faculty

The Program

The purpose of the graduate program in Political Science is to train professional political scientists who intend to pursue careers in research, teaching, and public service. The department offers programs leading to the M.A. and Ph.D. degrees. The programs are designed to enable students to acquire both methodological sophistication and substantive knowledge in a variety of fields.

The graduate program in Political Science encourages the study of a variety of substantive concerns, methodological approaches, and research skills. Among the department’s special areas of strength are United States politics and political behavior (legislative politics, public opinion and voting, parties and interest groups, and judicial process); political and social theory; international relations and peace science; and the politics of western and eastern Europe, Latin America, and South Asia; international conflict; international political economy; democratization; social movements; political culture; and gender and politics. A dual-degree program with Women's Studies is also available.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.
Entrance to the Political Science graduate program occurs in the fall semester. Applications must be received by the department not no later than January 15 for fall admission. However, the department will begin accepting applications as of September 1.

The Department of Political Science requires M.A. and Ph.D. program applicants to submit transcripts, Graduate Record Examinations (GRE) scores (verbal, quantitative, and analytical), a statement of career plans and proposed emphasis in political science, at least three letters of recommendation from persons familiar with the applicant’s academic performance, and a writing sample demonstrating research and/or analytical skills.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for IELTS is 6.5. Specific graduate programs may have more stringent requirements.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. Students can be admitted to the master’s degree program or, after passing a Ph.D. candidacy exam, can be admitted to the Ph.D. program with a master's degree.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

Depending on the student’s previous methodological training, 30 credits of course work, including an essay, are required for a master’s degree. At least 18 credits must be at the 500-level or above. The course work includes a methodological core of 9 credits (PL SC 501, 502, and 503); 12 credits in a primary field (including the survey seminar in the field); 6 credits in a secondary field; and 3 credits for the M.A. essay. Students also take a seminar on teaching and professional development in political science. There are no language requirements for the degree. Every master’s candidate is required to pass an examination of their master’s essay.
In the case of transfer students, a maximum of 10 credits earned in an advanced degree program at another university or in another department at Penn State will count toward the 30-credit requirement. For more information, refer to the Transfer Credit section in the Graduate Bulletin.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

The Department of Political Science requires a minimum total of 60 post-baccalaureate credits for the Ph.D. At least 45 credits, exclusive of the dissertation, must be in political science. Course work accepted for the M.A. in Political Science at Penn State will count toward the department’s 60-credit requirement. At least 45 credits, exclusive of the dissertation, must be in political science.

In the case of transfer students who have earned a maximum of 30 credits in an advanced degree program at another university or in another department at Penn State, a maximum of 30 credits may count toward the 60-credit departmental requirement.

The department requires that a student complete the designated “core” courses in methodology (PL SC 501, 502, and 503) and a seminar on teaching and professional development in political science. Ph.D. degree candidates must present three fields for the purposes of comprehensive examinations. The major and one of the minor fields must be selected from the department's recognized fields, and one of the minor fields may be outside political science. The major field requires a minimum of 15 credits; each minor field requires a minimum of 9 credits.

The communication and foreign language requirement for the Ph.D. may be satisfied by advanced course work and competence developed in foreign languages, statistics, or other research methods.

Dual-Title Doctoral Degree in Political Science and African Studies

Political Science doctoral students, who have research and educational interests in comparative policy analyses, environmental change and livelihood systems, socio-economic and political change, and other aspects of African Studies may apply to the Dual-Title Doctoral Degree Program in Political Science and African Studies. The goal of the program is to enable graduate students from Political Science to complement their knowledge and skills in a major area of specialization in Political Science with in-depth knowledge of prevailing theories on and problem-solving approaches to thematic, regional, or national issues pertaining to African development and change.

This Dual-Title Doctoral Degree Program provides interested Political Science doctoral students with a multidisciplinary approach that enhances their analytical capabilities for addressing key issues in African development and adds value to their Political Science degree by increasing their competitiveness in the job market. The well-rounded, regional specialist who
graduates from this program, is likely to be employed in an international setting. The program, therefore, enhances the reputation of the Political Science department, the College of the Liberal Arts, and Penn State.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Students must apply and be admitted to the graduate program in Political Science and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Political Science and include remarks in their statement of purpose that address the ways in which their research and professional goals in political science reflect an interest in African Studies-related research.

To be enrolled in the Dual-Title Doctoral Degree Program in African Studies, a student must submit a letter of application and transcript, which will be reviewed by an African Studies Admissions Committee. An applicant must have a minimum grade-point average of 3.0 (on a 4 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title degree program in African Studies prior to obtaining candidacy in Political Science.

General Graduate Council requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

To qualify for the dual-title degree, students must satisfy the requirements of the Political Science program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the African Studies Program. Final course selection is determined by the student in consultation with the Political Science and African Studies academic advisoradvisers.

Upon acceptance by the African Studies admissions committee, the student will be assigned an African Studies academic advisoradviser in consultation with the African Studies director and the African Studies admissions committee.

As a student develops specific scholarly interests, s/he may request a different African Studies advisoradviser from the one assigned by the African Studies admissions committee. The student and Political Science and African Studies academic advisoradvisers are to establish a program of study that is appropriate for the student’s professional objectives and that is in accordance with
the policies of the Graduate Council, the Political Science graduate program, and the African Studies Program.

Requirements for the Political Science-African Studies Ph.D.

The Ph.D. in Political Science and African Studies is awarded to students who are admitted to the Political Science doctoral program and admitted subsequently into the dual-title degree in African Studies. The minimum course requirements for the dual-title Ph.D. degree in Political Science and African Studies are as follows.

• A minimum of 60 post-baccalaureate credits. Course work accepted for the M.A. in Political Science will count toward the 60-credit requirement. At least 45 credits, exclusive of dissertation research credits, must be in Political Science.
• Completion of coursework in two major fields (the first of which is a Political Science subfield as detailed in the Political Science graduate handbook, and the second of which is in African Studies) and one minor field (in a regular Political Science subfield).
• Completion of the designated core of courses in methodology (PL SC 501, 502, and 503).
• Completion of two 1.5-credit seminars on teaching, writing, and professional development in Political Science.
• Completion of introductory field seminars appropriate to one’s two political science fields of study.
• AFR 501 (3).
• 15 credits of Africa-related coursework at the 400 or 500-level; minimum of 3 of these credits must be taken from a list of courses maintained by the African Studies program chair.
• As many as 6 of the 15 credits may come from Political Science, as approved by the student’s Political Science and African Studies Program academic advisors.
• The remaining credits can be taken in AFR or in any department other than Political Science. Of these, no more than 6 credits may be taken at the 400-level and no more than 3 combined credits may come from 596 and 599 listings.
• Communication and foreign language requirements, which will be determined by the student, the Political Science and African Studies Program advisors in accordance with the existing Political Science language requirements.

Foreign Language/Research Skills Competency Requirement

Language Requirement

The language requirement for a student in the dual-title doctoral degree program will be determined by the student and the Political Science and African Studies Program advisors in accordance with the existing Political Science language requirements. The Political Science Foreign Language/Research Skills Competency Requirement, contained in the Political Science Graduate Handbook, indicates that doctoral students must satisfy one of the following four option criteria to demonstrate proficiency in foreign language and/or research skills:
1) Reading proficiency and translation skills in two foreign languages. Proficiency is certified by the School of Languages and Literatures at Penn State. The School’s website details the procedures that students must follow to obtain certification (see http://sll.na.psu.edu/langprof.htm).

2) Superior command of one foreign language. Superior command is defined as the ability to use the language to conduct field research abroad. This may include the ability to live and work in the relevant foreign country; the ability to converse with librarians, government officials, and other gatekeepers of documents and information; and the ability to conduct interviews with citizens or officials. There is no single test or criterion for demonstrating superior command of a foreign language. Rather, the student must provide to the doctoral committee letters from language instructors, faculty who have conducted fieldwork in the language in question, and similar documents so that its members can determine if the language skill is sufficient given the student’s specialization and subfield.

3) Reading and translation proficiency in one foreign language plus a grade of B or higher in an advanced statistics course (i.e., material beyond that covered in PL SC 503) which has been approved by the student’s doctoral advisor and the Director of Graduate Studies.

4) A statistical methods specialization consisting of three advanced statistics courses (each covering material beyond what is covered in PL SC 503). Students must receive a grade of B or higher in each class. The selection of courses must be approved by the student’s doctoral advisor and the Director of Graduate Studies. These advanced courses may overlap with the advanced courses used if methodology is chosen as the student’s first or second minor field.

Candidacy Exam

The dual-title degree will be guided by the Candidacy Exam procedure of the Political Science graduate program. The candidacy exam for the dual-title degree may be given after at least 18 post-baccalaureate credits have been earned in graduate courses; it must be taken within three semesters (summer sessions do not count) of entry into the Political Science graduate program. There will be a single candidacy examination, containing elements of both Political Science and African Studies.

The candidacy examination committee for the dual-title degree will be composed of graduate faculty from Political Science and at least one graduate faculty member from the African Studies Program. The designated dual-title faculty member may be appointed from Political Science if that person holds a formal appointment with the African Studies program.

Doctoral Committee Composition

In accordance with Graduate Council policy, the doctoral committee of a Political Science and African Studies dual-title doctoral degree student must include at least one member of the African Studies graduate faculty. Faculty members who hold appointments in both programs’ graduate faculty may serve in a combined role. The African Studies representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit
Member, if his or her primary appointment is in an administrative unit outside the unit in which the dissertation adviser's primary appointment is held. The doctoral committee of a dual-title doctoral degree student must include a minimum of four Graduate Faculty members, i.e., the chair and at least three additional members. The committee must include at least one member of the African Studies graduate faculty.

If the chair of the committee representing Political Science is not also a member of the graduate faculty in African Studies, the member of the committee representing African Studies should be appointed as co-chair.

Comprehensive Exam

After completing all course work, doctoral candidates for the dual-title doctoral degree in Political Science and African Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a candidate’s major Political Science subfield and African Studies. The African Studies representative on the student’s doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. The African Studies component of the exam will be based on the student’s thematic, national, or regional area of interest and specialization in African Studies.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Political Science and African Studies.

Dual-Title Graduate Doctoral Degree in Political Science and Asian Studies

Graduate students with research and educational interests in international education may apply to the dual-title doctoral degree program in Political Science and Asian Studies Degree Program. The goal of the dual-title degree in Political Science and Asian Studies is to enable graduate students from Political Science to acquire the knowledge and skills of their major area of specialization in Political Science while at the same time gaining the perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title Ph.D. in Political Science and Asian Studies will add value to their degree and their status as candidates. It will produce excellent political scientists who are experts in Asian Studies as well. The dual-title degree Political Science and Asian Studies will build curricular bridges beyond the student’s major field so as to provide a unique training regime for the global scholar.

Additional details of the dual-title degree program are available in separate documentation and from the Department of Asian Studies' website (see http://asian.la.psu.edu/graduate.shtml).
Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

For admission to the Dual-Title Ph.D. degree program, a student must first apply and be admitted to the Political Science graduate program and the Graduate School. After admission to the Political Science graduate program, a student must then apply for admission to the Asian Studies Program. The Asian Studies admissions committee reviews applications and recommends student for admission to the Asian Studies program to the Graduate School. Applicants should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale) and appropriate course background. Students already in their first and second years of the Political Science graduate program may also apply to the dual-title program. Students must apply and be admitted to the dual-title graduate program in Political Science and Asian Studies prior to taking the candidacy exam.

In addition to the requirements of the Graduate School and Political Science, applicants interested in the dual-title program should also make their interest in the dual-degree program known clearly on their applications and include remarks in their statement of purpose that address the ways in which their research and professional goals reflect an interest in interdisciplinary and Asian Studies-related research.

General Graduate School requirements are state in the GENERAL INFORMATION section of the Graduate Bulletin.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

To qualify for an Asian Studies degree, students must satisfy the requirements of the Political Science program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Asian Studies committee. Within this framework, final course selection is determined by the student, their Asian Studies advisor, and their Political Science program advisor.

Upon a student’s acceptance by the Asian Studies admissions committee, the student will be assigned an Asian Studies academic advisor in consultation with the Asian Studies chair. As students develop specific scholarly interests, they may request that a different Asian Studies faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student’s professional objectives and that is in accord with the policies of The Graduate School, the Political Science department, and the Asian Studies program.
Requirements for the Political Science/Asian Studies Ph.D.

The doctoral degree in Political Science and Asian Studies is awarded only to students who are admitted to the Political Science doctoral program and admitted to the dual-title Ph.D. degree in Asian Studies. The minimum course requirements for the dual-title Ph.D. degree in Political Science and Asian Studies are as follows:

- A minimum total of 60 postbaccalaureate credits. Course work accepted for the M.A. in Political Science will count toward the 60-credit requirement. At least 45 credits, exclusive of dissertation, must be in political science.
- Completion of course work in two major fields (the first of which is a political science sub field as detailed in the Political Science graduate handbook, and the second of which is Asia-related) and one minor field (in a regular political science subfield).
- Completion of the designated core of courses in methodology (PL SC 501, 502, and 503).
- Completion of two, 1.5 credit seminars on teaching, writing, and professional development in political science.
- Completion of introductory field seminars appropriate to one's three fields of study.
- 15 credits of Asia-related coursework at the 400 or 500 level. At least 6 of these 15 credits will be from ASIA 501 and 502. As many as 6 may come from Political Science, as approved by the student’s doctoral advisor and the Asian Studies Program director of graduate studies. The remaining 3 credits can be taken in ASIA or in any department other than Political Science.
- All-skills proficiency is in one Asian Language AND two years’ college study (or equivalent knowledge) of another Asian language OR alternative proficiency appropriate to the student’s field.

Particular courses may satisfy both the Political Science requirements and those of the Asian Studies program. Final course selection is determined by the student in consultation with their dual-title program advisor and their major program advisor.

Language Requirement

Students must show all-skills proficiency in one Asian language. All-skills proficiency in a foreign language can be assessed through the following mechanisms: 1) native speaker status, 2) completion of graduate-level research using the foreign language, 3) study abroad, and 4) independent study or examination. All final determinations of all-skills proficiency will be made by a student’s Asian Studies doctoral adviser in consultation with the Asian Studies Director of Graduate Studies.

In addition to demonstrating all-skills proficiency in one Asian language, a student must also:

- Complete two years’ college study (or equivalent knowledge) of another Asian language OR
- Achieve alternative proficiency appropriate to the student’s field.
Candidacy Exam

The dual-title degree will be guided by the Candidacy Exam procedure of the Political Science graduate program. The candidacy exam for the dual-title degree may be given after at least 18 postbaccalaureate credits have been earned in graduate courses; it must be taken within three semesters (summer sessions do not count) of entry into the Political Science graduate program. There will be a single candidacy examination, containing elements of both Political Science and Asian Studies.

The candidacy examination committee for the dual-title degree will be composed of graduate faculty from Political Science and at least one graduate faculty member from the Asian Studies Program. The designated dual-title faculty member may be appointed from Political Science if that person holds a formal appointment with the Asian Studies program.

Doctoral Committee Composition

In accordance with Graduate Council policy, the doctoral committee of a Political Science and Asian Studies dual-title doctoral degree student must include at least one member of the Asian Studies graduate faculty. Faculty members who hold appointments in both programs’ graduate faculty may serve in a combined role. The Asian Studies representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit Member, if his or her primary appointment is in an administrative unit outside the unit in which the dissertation adviser’s primary appointment is held.

If the chair of the committee representing Political Science is not also a member of the graduate faculty in Asian Studies, the member of the committee representing Asian Studies must be appointed as co-chair.

Comprehensive Exam

After completing all course work, doctoral candidates for the dual-title doctoral degree in Political Science and Asian Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a candidate’s major Political Science subfield and Asian Studies. The Asian Studies representative on the student’s doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Political Science and Asian Studies.
Political Science doctoral students, who have research and educational interests in comparative policy analyses, environmental change and livelihood systems, socio-economic and political change, and other aspects of African Studies may apply to the Dual Title Doctoral Degree Program in Political Science and African Studies. The goal of the program is to enable graduate students from Political Science to complement their knowledge and skills in a major area of specialization in Political Science with in-depth knowledge of prevailing theories on and problem-solving approaches to thematic, regional, or national issues pertaining to African development and change.

The Dual Title Doctoral Degree Program provides interested Political Science doctoral students with a multidisciplinary approach that enhances their analytical capabilities for addressing key issues in African development and adds value to their Political Science degree by increasing their competitiveness in the job market. The well-rounded, regional specialist who graduates from this program, is likely to be employed in an international setting. The program, therefore, enhances the reputation of the Political Science department, the College of the Liberal Arts, and Penn State.

Admission Requirements

Students must apply and be admitted to the graduate program in Political Science and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Political Science and include remarks in their statement of purpose that address the ways in which their research and professional goals in political science reflect an interest in African Studies-related research.

To be enrolled in the Dual Title Doctoral Degree Program in African Studies, a student must submit a letter of application and transcript, which will be reviewed by an African Studies Admissions Committee. An applicant must have a minimum grade point average of 3.0 (on a 4-point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title degree program in African Studies prior to obtaining candidacy in Political Science.

General Graduate Council requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the requirements of the Political Science program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the African Studies Program. Final course selection is determined by the student in consultation with the Political Science and African Studies academic advisors.
Upon acceptance by the African Studies admissions committee, the student will be assigned an African Studies academic advisor in consultation with the African Studies director and the African Studies admissions committee.

As a student develops specific scholarly interests, s/he may request a different African Studies advisor from the one assigned by the African Studies admissions committee. The student and Political Science and African Studies academic advisors are to establish a program of study that is appropriate for the student’s professional objectives and that is in accordance with the policies of the Graduate Council, the Political Science graduate program and the African Studies Program.

Requirements for the Political Science-African Studies Ph.D.

The Ph.D. in Political Science and African Studies is awarded to students who are admitted to the Political Science doctoral program and admitted subsequently into the dual-title degree in African Studies. The minimum course requirements for the dual-title Ph.D. degree in Political Science and African Studies are as follows:

- A minimum of 60 post-baccalaureate credits. Course work accepted for the M.A. in Political Science will count toward the 60-credit requirement. At least 45 credits, exclusive of dissertation research credits, must be in Political Science.
- Completion of coursework in two major fields (the first of which is a Political Science subfield as detailed in the Political Science graduate handbook, and the second of which is in African Studies) and one minor field (in a regular Political Science subfield).
- Completion of the designated core of courses in methodology (PL SC 501, 502, and 503).
- Completion of two 1.5-credit seminars on teaching, writing, and professional development in Political Science.
- Completion of introductory field seminars appropriate to one’s two political science fields of study.
- AFR 501 (3).
- 15 credits of Africa-related coursework at the 400 or 500-level; minimum of 3 of these credits must be taken from a list of courses maintained by the African Studies program chair.
- As many as 6 of the 15 credits may come from Political Science, as approved by the student’s Political Science and African Studies Program academic advisors.
- The remaining credits can be taken in AFR or in any department other than Political Science. Of these, no more than 6 credits may be taken at the 400-level and no more than 3 combined credits may come from 596 and 599 listings.
- Communication and foreign language requirements, which will be determined by the student, the Political Science and African Studies Program advisors in accordance with the existing Political Science language requirements.
Language Requirement

The language requirement for a student in the Dual Title Doctoral Degree Program will be determined by the student and the Political Science and African Studies Program advisors in accordance with the existing Political Science language requirements. The Political Science Foreign Language/Research Skills Competency requirement, contained in the Political Science Graduate Handbook, indicates that Doctoral students must satisfy one of the following four options to demonstrate proficiency in foreign language and/or research skills:

1) Reading proficiency and translation skills in two foreign languages. Proficiency is certified by the School of Languages and Literatures at Penn State. The School’s website details the procedures that students must follow to obtain certification (see http://sll.la.psu.edu/langprof.htm).

2) Superior command of one foreign language. Superior command is defined as the ability to use the language to conduct field research abroad. This may include the ability to live and work in the relevant foreign country; the ability to converse with librarians, government officials, and other gatekeepers of documents and information; and the ability to conduct interviews with citizens or officials. There is no single test or criterion for demonstrating superior command of a foreign language. Rather, the student must provide to the doctoral committee letters from language instructors, faculty who have conducted fieldwork in the language in question, and similar documents so that its members can determine if the language skill is sufficient given the student’s specialization and subfield.

3) Reading and translation proficiency in one foreign language plus a grade of B or higher in an advanced statistics course (i.e., material beyond that covered in PL SC 503) which has been approved by the student’s doctoral advisor and the Director of Graduate Studies.

4) A statistical methods specialization consisting of three advanced statistics courses (each covering material beyond what is covered in PL SC 503). Students must receive a grade of B or higher in each class. The selection of courses must be approved by the student’s doctoral advisor and the Director of Graduate Studies. These advanced courses may overlap with the advanced courses used if methodology is chosen as the student’s first or second minor field.

Candidacy Exam
The dual-title degree will be guided by the Candidacy Exam procedure of the Political Science graduate program. The candidacy exam for the dual-title degree may be given after at least 18 post-baccalaureate credits have been earned in graduate courses; it must be taken within three semesters (summer sessions do not count) of entry into the Political Science graduate program. There will be a single candidacy examination, containing elements of both Political Science and African Studies.

The candidacy examination committee for the dual-title degree will be composed of graduate faculty from Political Science and at least one graduate faculty member from the African Studies Program. The designated dual-title faculty member may be appointed from Political Science if that person holds a formal appointment with the African Studies program.

Committee Composition

The doctoral committee of a dual-title doctoral degree student must include a minimum of four Graduate Faculty members, i.e., the chair and at least three additional members. The committee must include at least one member of the African Studies graduate faculty.

If the chair of the committee representing Political Science is not also a member of the graduate faculty in African Studies, the member of the committee representing African Studies should be appointed as co-chair.

Comprehensive Exam

After completing all course work, doctoral candidates for the dual-title doctoral degree in Political Science and African Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a candidate’s major Political Science subfield and African Studies. The African Studies representative on the student’s doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. The African Studies component of the exam will be based on the student’s thematic, national or regional area of interest and specialization in African Studies.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Political Science and African Studies.

Dual-Title Doctoral Degree in Political Science and Social Data Analytics
Political Science doctoral students seeking to attain and be identified with an interdisciplinary array of tools, techniques, and methodologies for social data analytics, while maintaining a close association with political science, may apply to pursue a dual-title Ph.D. in Political Science and Social Data Analytics.

Social data analytics is the integration of social scientific, computational, informational, statistical, and visual analytic approaches to the analysis of large or complex data that arise from human interaction. The dual-title Ph.D. aims to enable scientists who expand the capability of social data analytics, and use those capabilities creatively to answer important social scientific questions and to address grand social challenges, in both academic and nonacademic settings.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Students must apply and be admitted to the graduate program in Political Science and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Political Science and include remarks in their statement of purpose that address the ways in which their research and professional goals in political science reflect an expanded interest in Social Data Analytics-related research.

To be enrolled in the dual-title doctoral Ph.D. in Political Science and Social Data Analytics, a student must submit a letter of application and transcript, which will be reviewed by the Social Data Analytics Program. An applicant must have a minimum grade-point average of 3.0 (on a 4.0 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title Ph.D. in Social Data Analytics prior to obtaining candidacy in Political Science.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

To qualify for the dual-title degree, students must satisfy the requirements of the Ph.D in Political Science. In addition, they must satisfy the requirements described below, as established by the Social Data Analytics Committee. Within this framework, final course selection is determined by the student in consultation with academic advisers from their home department adviser and Social Data Analytics.

Course work
The minimum course work requirements for the dual-title Ph.D. in Political Science and Social Data Analytics are as follows:
• Course work and other requirements of the Ph.D. in Political Science.
• SO DA 501 (3 credits)
• SO DA 502 (3 credits)
• 12 or more elective credits in Social Data Analytics from a list of courses maintained by the Social Data Analytics Committee. Collectively the elective credits must satisfy the following requirements:
  ○ (A) Core analytics distribution. 3 or more credits in courses focused on statistical learning, machine learning, data mining, or visual analytics. Courses approved as meeting this requirement are designated (A) on the list of approved electives.
  ○ (Q) Quantification distribution. 6 or more credits in courses focused on statistical inference or quantitative social science methodology. Courses approved as meeting this requirement are designated (Q) on the list of approved electives. *(A Political Science Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Political Science Ph.D.)*
  ○ (C) Computational / informational distribution. 6 or more credits in courses focused on computation, collection, management, processing, or interaction with electronic data, especially at scale. Courses approved as meeting this requirement are designated (C) on the list of approved electives.
  ○ (S) Social distribution. 6 or more credits in courses with substantial content on the nature of human interaction and/or the analysis of data derived from human interaction and/or the social context or ethics or social consequences of social data analytics. Courses approved as meeting this requirement are designated (S) on the list of approved electives. *(A Political Science Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Political Science Ph.D.)*
  ○ Cross-departmental distribution.
    ▪ 3 or more credits in approved courses with the prefix STAT or that of a primarily social science department. *(A Political Science Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Political Science Ph.D.)*
    ▪ 3 or more credits in approved courses with the prefix IST, GEOG, or that of a primarily computer science or engineering department.
    ▪ 6 or more credits in approved courses outside Political Science.
    ▪ 3 or fewer credits in approved courses at the 400-level.

Students or faculty may request that the Social Data Analytics Committee consider approval of elective designations for any course, including temporary approvals for experimental or variable-title courses. Students are encouraged to take interdisciplinary courses that carry multiple (A), (Q), (C), (S) designations, as well as to select SO DA electives that also meet requirements of the primary program. In particular, the 12 elective credits can be met with as few as 6 credits of appropriately chosen course work. Within this framework, final course selection is determined by the student in consultation with academic advisers from Political Science and Social Data Analytics. There is no formal maximum number of credits from the primary PL SC degree that can be double-counted toward the SO DA degree. For those meeting the SO DA elective
requirement with the minimum of 12 credits, the outside-program minimum effectively limits the
total number of primary degree PL SC credits that count toward SO DA at 6. Advising committees
may limit the number of credits taken for the SO DA degree that can count toward home degree
requirements.

**Candidacy Committee and Exam**
The candidacy examination committee will be composed in accordance with rules of the Political
Science Ph.D. and will include at least one graduate faculty member from the Social Data
Analytics Program. Faculty members who hold appointments in both programs’ graduate faculty
may serve in a combined role.

The dual-title degree will be guided by the Candidacy Exam procedure of the Political Science
graduate program. The candidacy exam for the dual-title degree may be given after at least 18
postbaccalaureate credits have been earned in graduate courses; it must be held within three
semesters (summer sessions do not count) of entry into the Political Science graduate program.
There will be a single candidacy examination to assess whether the student should be admitted
into Ph.D. candidacy in both Political Science and Social Data Analytics.

The Social Data Analytics Program maintains a list of recommended background and skills that
it recommends students have in place by the time they begin the interdisciplinary course work
required to complete the Social Data Analytics degree. The candidacy exam is the appropriate
setting for assessing the student’s preparation for the interdisciplinary work of the dual-title
Ph.D. in Political Science and Social Data Analytics.

**Doctoral Committee Composition**
The doctoral committee must conform to all requirements of the primary program and the
Graduate Council. In accordance with Graduate Council policy, the doctoral committee of a
Political Science and Social Data Analytics dual-title doctoral degree student must include at
least one member of the Social Data Analytics graduate faculty. Faculty members who hold
appointments in both programs’ graduate faculty may serve in a combined role. The Social Data
Analytics representative to the committee may serve as the Outside Field Member, and may also
serve as the Outside Unit Member, if his or her primary appointment is in an administrative unit
outside the unit in which the dissertation adviser's primary appointment is held.

If the chair of the committee representing Political Science is not also a member of the graduate
faculty in Social Data Analytics, the member of the committee representing Social Data
Analytics must be appointed as co-chair. The ideal arrangement then, is for a member of the
Social Data Analytics graduate faculty with primary appointment in Political Science to act as
dissertation chair, and for a member of the Social Data Analytics graduate faculty with primary
appointment outside the administrative unit of the primary program to act as both Outside Field
Member and Outside Unit Member.
**Comprehensive Exam**

After completing all course work, doctoral candidates for the dual-title doctoral degree in Political Science and Social Data Analytics must pass a comprehensive examination that includes written and oral components.

Written components will be administered on a candidate’s major Political Science subfield and Social Data Analytics (acting as a first minor field). The Social Data Analytics representative(s) on the student’s doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

The oral component of the comprehensive involves the defense of a dissertation prospectus, which must contain substantial Social Data Analytics content.

**Dissertation and Dissertation Defense**

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Political Science and Social Data Analytics.

**Dual-Title Graduate Degree in Political Science and Women’s Studies**

Graduate students with research and teaching interests in gender and politics may apply to the dual-title master’s or doctoral degree program in Political Science and Women’s Studies Degree Program. The goal of the dual-title graduate degree program in Political Science and Women’s Studies is to enable graduate students from Political Science to acquire the knowledge and skills of their major area of specialization in Political Science while at the same time gaining the perspective of Women’s Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title PhD graduate degree in Women’s Studies will add value to their degree and their status as candidates. It will produce excellent political scientists who are experts in Women’s Studies as well. The dual-title graduate degree in Political Science and Women’s Studies will build curricular bridges beyond the student’s major field so as to provide a unique training regime for the interdisciplinary scholar.

Additional details of the dual-title program are available at the Department of Women’s, Gender, and Sexuality Studies website.

**Admission Requirements**

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Students must apply and be admitted to the graduate program in Political Science and the
Graduate School before they can apply for admission to the dual-title degree program in Women’s Studies. Doctoral students must apply and be admitted to the dual-title Ph.D. program prior to taking the candidacy exam.

Students will be admitted to graduate study in Women’s Studies by an admissions committee of Women’s Studies-affiliated faculty. The Women’s Studies program will follow the timetable and admission requirements of Political Science. Applicants should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale) and appropriate course background should be considered for study. Prospective students seeking admission to the dual-title degree program must write a statement of purpose that addresses the ways in which their research and professional goals will reflect an interest in interdisciplinary and feminist research.

Additional details of the dual degree program are available in separate documentation and from the Women’s Studies Program (see http://www.womenstudies.psu.edu/graduate/).

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

The Dual-Title Master of Arts in Political Science and Women’s Studies (30 credits plus thesis/essay)

- 12 credits in major political science field (including proseminar)
- Political Science 501: Methods of Political Analysis (3)
- Political Science 502: Statistical Methods for Political Research (3)
- Women’s Studies 501: Feminist Perspectives in Research and Teaching (3)
- Women’s Studies 502: Global Perspectives on Feminism (3)
- Women’s Studies 507: Feminist Theory (3)
- 3 elective credits in Women’s Studies approved courses (may double count if in political science field)
- Oral exam and M.A. essay defense as specified in the Department of Political Science Graduate Student Handbook.

Of these requirements, at least 21 credits must be at the 500 level. In addition there is a 6-credit maximum for independent study and a 10-credit maximum for transfer credits. For more information, refer to the Transfer Credit section in the Graduate Bulletin. The student is expected to conduct research for the M.A. essay on a Women’s Studies topic.
For the dual-title Master of Arts degree in Political Science and Women’s Studies, the student’s committee will include at least one Women’s Studies-affiliated faculty member.

The Dual-Title Ph.D. Degree in Political Science and Women’s Studies (60 credits)**

- 15 credits in major political science field (including proseminar)
- 9 credits in 2nd minor political science field
- Political Science 501: Methods of Political Analysis (3)
- Political Science 502: Statistical Methods for Political Research (3)
- Political Science 503: Multivariate Analysis for Political Research (3-6)
- Women's Studies 501: Feminist Perspectives in Research and Teaching (3)
- Women's Studies 502: Global Perspectives on Feminism (3)
- Women's Studies 507: Feminist Theory (3)
- 9 elective credits in Women's Studies approved courses (may double count if in political science field)
- Ph.D. candidacy exam in major political science field, plus portfolio of Women's Studies work.

- Of these requirements at least 51 credits must be at the 500 level. In addition there is a 12-credit maximum for independent study, and a 30-credit maximum for transfer credits.

- Candidacy Examination Committee Composition: The candidacy examination committee for the dual-title degree will be composed of graduate faculty from Political Science and at least one graduate faculty member from the Women’s Studies Program. The designated dual-title faculty member may be appointed from Political Science if that person holds a formal appointment with the Women’s Studies program, Student’s Faculty Advisor, a member of Graduate Studies Committee, and an additional faculty member from whom the student has taken a course(s). (One committee member should be affiliated with Women's Studies.)

- Candidacy Exam: In accordance with Graduate Council requirements policy, the candidacy examination will assess candidacy for both the primary and the dual-title program. The candidacy exam for the dual-title degree may be given after at least 18 postbaccalaureate credits have been earned in graduate courses; it must be taken within three semesters (summer sessions do not count) of entry into the Political Science graduate program.

- Doctoral Committee Composition: In accordance with Graduate Council policy, the doctoral committee of a Political Science and Women’s Studies dual-title doctoral degree student must
include at least one member of the Women’s Studies graduate faculty. Faculty members who hold appointments in both programs’ graduate faculty may serve in a combined role. The Women’s Studies representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit Member, if his or her primary appointment is in an administrative unit outside the unit in which the dissertation adviser's primary appointment is held.

If the chair of the committee representing Political Science is not also a member of the graduate faculty in Women’s Studies, the member of the committee representing Women’s Studies must be appointed as co-chair. In accordance with Graduate Council requirements, the doctoral committee shall contain at least four members. Two of the four members must be affiliated with Women’s Studies. This requirement may be waived with agreement of heads of Political Science and Women’s Studies.

**Comprehensive Exam:** After completion of required course work, doctoral candidates for the dual-title doctoral degree must pass a comprehensive examination. The dual-title faculty representative on the student’s doctoral committee will participate in the writing and evaluation of the examination.

**Doctoral Dissertation and Dissertation Defense:** Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in their home discipline and Women’s Studies. The doctoral dissertation must be on a Women’s Studies inflected topic.

Students must pass the Ph.D. qualifying candidacy and comprehensive exams and have their dissertation proposal approved as specified in the Department of Political Science Graduate Student Handbook.

* The Department of Political Science requires a minimum total of 60 postbaccalaureate credits for the Ph.D. At least 45 credits, exclusive of the dissertation, must be in political science. Course work accepted for the M.A. in Political Science at Penn State will count toward the department’s 60-credit requirement. In the case of students who have earned credits in an advanced degree program at another university or in another department at Penn State, a maximum of 30 credits may count toward the 60-credit departmental requirement.

*Ph.D. credit requirements include those earned in pursuit of an M.A. degree at PSU or up to thirty transfer credits from another MA program.

**Other Relevant Information**

Penn State is a member of the Committee on Institutional Cooperation (CIC), an association of the Big Ten universities and the University of Chicago. The CIC sponsors the Traveling Scholars program, which provides doctoral-level students with an opportunity to study at another CIC
university. In addition to participating in CIC programs, the department sponsors attendance at the ICPSR Summer program at the University of Michigan.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

POLITICAL SCIENCE (PL SC) course list
VI. Proposed Amendment to Graduate Bulletin for Political Science (PL SC) (clean copy)

Political Science (PL SC)

Program Home Page

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Degrees Conferred:

Ph.D., M.A.
Dual-Title Graduate Degree (Ph.D.) in Political Science and African Studies
Dual-Title Graduate Degree (Ph.D.) in Political Science and Asian Studies
Dual-Title Graduate Degree (Ph.D.) in Political Science and Social Data Analytics
Dual-Title Graduate Degree (Ph.D.) in Political Science and Women's Studies

The Graduate Faculty

The Program

The purpose of the graduate program in Political Science is to train professional political scientists who intend to pursue careers in research, teaching, and public service. The department offers programs leading to the M.A. and Ph.D. degrees. The programs are designed to enable students to acquire both methodological sophistication and substantive knowledge in a variety of fields.

The graduate program in Political Science encourages the study of a variety of substantive concerns, methodological approaches, and research skills. Among the department’s special areas of strength are United States politics and political behavior (legislative politics, public opinion and voting, parties and interest groups, and judicial process); political and social theory; international relations and peace science; the politics of western and eastern Europe, Latin America, and South Asia; international conflict; international political economy; democratization; social movements; political culture; and gender and politics.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Entrance to the Political Science graduate program occurs in the fall semester. Applications must be received by the department no later than January 15 for fall admission. However, the department will begin accepting applications as of September 1.
The Department of Political Science requires M.A. and Ph.D. program applicants to submit transcripts, Graduate Record Examinations (GRE) scores (verbal, quantitative, and analytical), a statement of career plans and proposed emphasis in political science, at least three letters of recommendation from persons familiar with the applicant’s academic performance, and a writing sample demonstrating research and/or analytical skills.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Students can be admitted to the master’s degree program or, after passing a Ph.D. candidacy exam, can be admitted to the Ph.D. program with a master's degree.

Master’s Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

Depending on the student’s previous methodological training, 30 credits of course work, including an essay, are required for a master’s degree. At least 18 credits must be at the 500-level or above. The course work includes a methodological core of 9 credits (PL SC 501, 502, and 503); 12 credits in a primary field (including the survey seminar in the field); 6 credits in a secondary field; and 3 credits for the M.A. essay. Students also take a seminar on teaching and professional development in political science. There are no language requirements for the degree. Every master’s candidate is required to pass an examination of their master’s essay.

In the case of transfer students, a maximum of 10 credits earned in an advanced degree program at another university or in another department at Penn State may count toward the 30-credit requirement. For more information, refer to the Transfer Credit section in the Graduate Bulletin.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

The Department of Political Science requires a minimum total of 60 postbaccalaureate credits for the Ph.D. At least 45 credits, exclusive of the dissertation, must be in political science. Course work accepted for the M.A. in Political Science at Penn State will count toward the department’s 60-credit requirement. In the case of students who have earned credits in an advanced degree program at another university or in another department at Penn State, a maximum of 30 credits may count toward the 60-credit departmental requirement.

The department requires that a student complete the designated “core” courses in methodology (PL SC 501, 502, and 503) and a seminar on teaching and professional development in political science. Ph.D. degree candidates must present three fields for the purposes of comprehensive
examinations. The major and one of the minor fields must be selected from the department's recognized fields, and one of the minor fields may be outside political science. The major field requires a minimum of 15 credits; each minor field requires a minimum of 9 credits.

The communication and foreign language requirement for the Ph.D. may be satisfied by advanced course work and competence developed in foreign languages, statistics, or other research methods.

**Dual-Title Doctoral Degree in Political Science and African Studies**

Political Science doctoral students, who have research and educational interests in comparative policy analyses, environmental change and livelihood systems, socioeconomic and political change, and other aspects of African Studies may apply to the dual-title doctoral degree program in Political Science and African Studies. The goal of the program is to enable graduate students from Political Science to complement their knowledge and skills in a major area of specialization in Political Science with in-depth knowledge of prevailing theories on and problem-solving approaches to thematic, regional, or national issues pertaining to African development and change.

This dual-title doctoral degree program provides interested Political Science doctoral students with a multidisciplinary approach that enhances their analytical capabilities for addressing key issues in African development and adds value to their Political Science degree by increasing their competitiveness in the job market. The well-rounded, regional specialist who graduates from this program is likely to be employed in an international setting. The program, therefore, enhances the reputation of the Political Science department, the College of the Liberal Arts, and Penn State.

**Admission Requirements**

Requirements listed here are in addition to requirements stated in the [GENERAL INFORMATION section of the Graduate Bulletin](#).

Students must apply and be admitted to the graduate program in Political Science and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Political Science and include remarks in their statement of purpose that address the ways in which their research and professional goals in political science reflect an interest in African Studies-related research.

To be enrolled in the Dual-Title Doctoral Degree Program in African Studies, a student must submit a letter of application and transcript, which will be reviewed by an African Studies Admissions Committee. An applicant must have a minimum grade-point average of 3.0 (on a 4 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title degree program in African Studies prior to obtaining candidacy in Political Science.
Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

To qualify for the dual-title degree, students must satisfy the requirements of the Political Science program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the African Studies Program. Final course selection is determined by the student in consultation with the Political Science and African Studies academic advisers.

Upon acceptance by the African Studies admissions committee, the student will be assigned an African Studies academic adviser in consultation with the African Studies director and the African Studies admissions committee.

As a student develops specific scholarly interests, s/he may request a different African Studies adviser from the one assigned by the African Studies admissions committee. The student and Political Science and African Studies academic advisers are to establish a program of study that is appropriate for the student’s professional objectives and that is in accordance with the policies of the Graduate Council, the Political Science graduate program, and the African Studies Program.

Requirements for the Political Science-African Studies Ph.D.

The Ph.D. in Political Science and African Studies is awarded to students who are admitted to the Political Science doctoral program and admitted subsequently into the dual-title degree in African Studies. The minimum course requirements for the dual-title Ph.D. degree in Political Science and African Studies are as follows.

- A minimum of 60 postbaccalaureate credits. Course work accepted for the M.A. in Political Science will count toward the 60 credit requirement. At least 45 credits, exclusive of dissertation research credits, must be in Political Science.
- Completion of course work in two major fields (the first of which is a Political Science subfield as detailed in the Political Science graduate handbook, and the second of which is in African Studies) and one minor field (in a regular Political Science subfield).
- Completion of the designated core of courses in methodology (PL SC 501, 502, and 503).
- Completion of two 1.5-credit seminars on teaching, writing, and professional development in Political Science.
- Completion of introductory field seminars appropriate to one’s two political science fields of study.
- AFR 501 (3).
- 15 credits of Africa-related course work at the 400 or 500-level; minimum of 3 of these credits must be taken from a list of courses maintained by the African Studies program chair.
- As many as 6 of the 15 credits may come from Political Science, as approved by the student’s Political Science and African Studies Program academic advisers.
- The remaining credits can be taken in AFR or in any department other than Political Science.
Of these, no more than 6 credits may be taken at the 400-level and no more than 3 combined credits may come from 596 and 599 listings.

- Communication and foreign language requirements, which will be determined by the student, the Political Science and African Studies Program advisers in accordance with the existing Political Science language requirements.

**Foreign Language/Research Skills Competency Requirement**

The language requirement for a student in the dual-title doctoral degree program will be determined by the student and the Political Science and African Studies program advisers in accordance with the existing Political Science language requirements. The Political Science Foreign Language/Research Skills Competency Requirement, contained in the Political Science Graduate Handbook, indicates that doctoral students must satisfy one of the following four criteria to demonstrate proficiency in foreign language and/or research skills:

1) Reading proficiency and translation skills in two foreign languages. Proficiency is certified by the School of Languages and Literatures at Penn State. [The School’s website details the procedures that students must follow to obtain certification](#).

2) Superior command of one foreign language. Superior command is defined as the ability to use the language to conduct field research abroad. This may include the ability to live and work in the relevant foreign country; the ability to converse with librarians, government officials, and other gatekeepers of documents and information; and the ability to conduct interviews with citizens or officials. There is no single test or criterion for demonstrating superior command of a foreign language. Rather, the student must provide to the doctoral committee letters from language instructors, faculty who have conducted fieldwork in the language in question, and similar documents so that its members can determine if the language skill is sufficient given the student’s specialization and subfield.

3) Reading and translation proficiency in one foreign language plus a grade of B or higher in an advanced statistics course (i.e., material beyond that covered in PL SC 503) which has been approved by the student’s doctoral adviser and the Director of Graduate Studies.

4) A statistical methods specialization consisting of three advanced statistics courses (each covering material beyond what is covered in PL SC 503). Students must receive a grade of B or higher in each class. The selection of courses must be approved by the student’s doctoral adviser and the Director of Graduate Studies. These advanced courses may overlap with the advanced courses used if methodology is chosen as the student's first or second minor field.

**Candidacy Exam**

The dual-title degree will be guided by the Candidacy Exam procedure of the Political Science graduate program. The candidacy exam for the dual-title degree may be given after at least 18 postbaccalaureate credits have been earned in graduate courses; it must be taken within three semesters (summer sessions do not count) of entry into the Political Science graduate program.
There will be a single candidacy examination, containing elements of both Political Science and African Studies.

The candidacy examination committee for the dual-title degree will be composed of graduate faculty from Political Science and at least one graduate faculty member from the African Studies Program. The designated dual-title faculty member may be appointed from Political Science if that person holds a formal appointment with the African Studies program.

**Doctoral Committee Composition**

In accordance with Graduate Council policy, the doctoral committee of a Political Science and African Studies dual-title doctoral degree student must include at least one member of the African Studies graduate faculty. Faculty members who hold appointments in both programs’ graduate faculty may serve in a combined role. The African Studies representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit Member, if his or her primary appointment is in an administrative unit outside the unit in which the dissertation adviser's primary appointment is held.

If the chair of the committee representing Political Science is not also a member of the graduate faculty in African Studies, the member of the committee representing African Studies must be appointed as co-chair.

**Comprehensive Exam**

After completing all course work, doctoral candidates for the dual-title doctoral degree in Political Science and African Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a candidate’s major Political Science subfield and African Studies. The African Studies representative on the student’s doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. The African Studies component of the exam will be based on the student's thematic, national, or regional area of interest and specialization in African Studies.

**Dissertation and Dissertation Defense**

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Political Science and African Studies.

**Dual-Title Doctoral Degree in Political Science and Asian Studies**

Graduate students with research and educational interests in international education may apply to the dual-title doctoral degree program in Political Science and Asian Studies. The goal of the dual-title degree in Political Science and Asian Studies is to enable graduate students from Political Science to acquire the knowledge and skills of their major area of specialization in Political Science while at the same time gaining the perspective of Asian Studies.
In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title Ph.D. in Political Science and Asian Studies will add value to their degree and their status as candidates. It will produce excellent political scientists who are experts in Asian Studies as well. The dual-title degree Political Science and Asian Studies will build curricular bridges beyond the student’s major field so as to provide a unique training regime for the global scholar.

Additional details of the dual-title program are available at the Department of Asian Studies' website.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

For admission to the dual-title Ph.D. program, a student must first apply and be admitted to the Political Science graduate program and the Graduate School. After admission to the Political Science graduate program, a student must then apply for admission to the Asian Studies Program. The Asian Studies admissions committee reviews applications and recommends student for admission to the Asian Studies program to the Graduate School. Applicants should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale) and appropriate course background. Students already in their first and second years of the Political Science graduate program may also apply to the dual-title program. Students must apply and be admitted to the dual-title graduate program in Political Science and Asian Studies prior to taking the candidacy exam.

In addition to the requirements of the Graduate School and Political Science, applicants interested in the dual-title program should also make their interest in the dual-title program known clearly on their applications and include remarks in their statement of purpose that address the ways in which their research and professional goals reflect an interest in interdisciplinary and Asian Studies-related research.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

To qualify for an Asian Studies degree, students must satisfy the requirements of the Political Science program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Asian Studies committee. Within this framework, final course selection is determined by the student, their Asian Studies adviser, and their Political Science program adviser.

Upon a student’s acceptance by the Asian Studies admissions committee, the student will be assigned an Asian Studies academic adviser in consultation with the Asian Studies chair. As
students develop specific scholarly interests, they may request that a different Asian Studies faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student’s professional objectives and that is in accord with the policies of the Graduate School, the Political Science department, and the Asian Studies program.

Requirements for the Political Science/Asian Studies Ph.D.

The doctoral degree in Political Science and Asian Studies is awarded only to students who are admitted to the Political Science doctoral program and admitted to the dual-title Ph.D. degree in Asian Studies. The minimum course requirements for the dual-title Ph.D. degree in Political Science and Asian Studies are as follows:

- A minimum total of 60 postbaccalaureate credits. Course work accepted for the M.A. in Political Science will count toward the 60-credit requirement. At least 45 credits, exclusive of dissertation, must be in political science.
- Completion of course work in two major fields (the first of which is a political science sub field as detailed in the Political Science graduate handbook, and the second of which is Asia-related) and one minor field (in a regular political science subfield).
- Completion of the designated core of courses in methodology (PL SC 501, 502, and 503).
- Completion of two, 1.5 credit seminars on teaching, writing, and professional development in political science.
- Completion of introductory field seminars appropriate to one's three fields of study.
- 15 credits of Asia-related course work at the 400 or 500 level. At least 6 of these 15 credits will be from ASIA 501 and 502. As many as 6 may come from Political Science, as approved by the student’s doctoral adviser and the Asian Studies Program director of graduate studies. The remaining 3 credits can be taken in ASIA or in any department other than Political Science.
- All-skills proficiency in one Asian Language AND two years’ college study (or equivalent knowledge) of another Asian language OR alternative proficiency appropriate to the student’s field.

Particular courses may satisfy both the Political Science requirements and those of the Asian Studies program. Final course selection is determined by the student in consultation with their dual-title program advisers and their major program advisers.

Language Requirement

Students must show all-skills proficiency in one Asian language. All-skills proficiency in a foreign language can be assessed through the following mechanisms: 1) native speaker status, 2) completion of graduate-level research using the foreign language, 3) study abroad, and 4) independent study or examination. All final determinations of all-skills proficiency will be made by a student’s Asian Studies doctoral adviser in consultation with the Asian Studies Director of Graduate Studies.

In addition to demonstrating all-skills proficiency in one Asian language, a student must also:
• Complete two years’ college study (or equivalent knowledge) of another Asian language
OR
• Achieve alternative proficiency appropriate to the student’s field.

Candidacy Exam

The dual-title degree will be guided by the Candidacy Exam procedure of the Political Science graduate program. The candidacy exam for the dual-title degree may be given after at least 18 postbaccalaureate credits have been earned in graduate courses; it must be taken within three semesters (summer sessions do not count) of entry into the Political Science graduate program. There will be a single candidacy examination, containing elements of both Political Science and Asian Studies.

The candidacy examination committee for the dual-title degree will be composed of graduate faculty from Political Science and at least one graduate faculty member from the Asian Studies Program. The designated dual-title faculty member may be appointed from Political Science if that person holds a formal appointment with the Asian Studies program.

Doctoral Committee Composition

In accordance with Graduate Council policy, the doctoral committee of a Political Science and Asian Studies dual-title doctoral degree student must include at least one member of the Asian Studies graduate faculty. Faculty members who hold appointments in both programs’ graduate faculty may serve in a combined role. The Asian Studies representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit Member, if his or her primary appointment is in an administrative unit outside the unit in which the dissertation adviser’s primary appointment is held.

If the chair of the committee representing Political Science is not also a member of the graduate faculty in Asian Studies, the member of the committee representing Asian Studies must be appointed as co-chair.

Comprehensive Exam

After completing all course work, doctoral candidates for the dual-title doctoral degree in Political Science and Asian Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a candidate’s major Political Science subfield and Asian Studies. The Asian Studies representative on the student’s doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are
required to write and orally defend a dissertation on a topic that reflects their original research and education in Political Science and Asian Studies.

**Dual-Title Doctoral Degree in Political Science and Social Data Analytics**

Political Science doctoral students seeking to attain and be identified with an interdisciplinary array of tools, techniques, and methodologies for social data analytics, while maintaining a close association with political science, may apply to pursue a dual-title Ph.D. in Political Science and Social Data Analytics.

Social data analytics is the integration of social scientific, computational, informational, statistical, and visual analytic approaches to the analysis of large or complex data that arise from human interaction. The dual-title Ph.D. aims to enable scientists who expand the capability of social data analytics, and use those capabilities creatively to answer important social scientific questions and to address grand social challenges, in both academic and nonacademic settings.

**Admission Requirements**

Requirements listed here are in addition to requirements stated in the [GENERAL INFORMATION section of the Graduate Bulletin.](#)

Students must apply and be admitted to the graduate program in Political Science and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Political Science and include remarks in their statement of purpose that address the ways in which their research and professional goals in political science reflect an expanded interest in Social Data Analytics-related research.

To be enrolled in the dual-title doctoral Ph.D. in Political Science and Social Data Analytics, a student must submit a letter of application and transcript, which will be reviewed by the Social Data Analytics Program. An applicant must have a minimum grade-point average of 3.0 (on a 4.0 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title Ph.D. in Social Data Analytics prior to obtaining candidacy in Political Science.

**Degree Requirements**

Requirements listed here are in addition to requirements stated in the [DEGREE REQUIREMENTS section of the Graduate Bulletin.](#)

To qualify for the dual-title degree, students must satisfy the requirements of the Ph.D in Political Science. In addition, they must satisfy the requirements described below, as established by the Social Data Analytics Committee. Within this framework, final course selection is determined by the student in consultation with academic advisers from their home department adviser and Social Data Analytics.
Course work
The minimum course work requirements for the dual-title Ph.D. in Political Science and Social Data Analytics are as follows:

- Course work and other requirements of the Ph.D. in Political Science.
- SO DA 501 (3 credits)
- SO DA 502 (3 credits)
- 12 or more elective credits in Social Data Analytics from a list of courses maintained by the Social Data Analytics Committee. Collectively the elective credits must satisfy the following requirements:
  - (A) Core analytics distribution. 3 or more credits in courses focused on statistical learning, machine learning, data mining, or visual analytics. Courses approved as meeting this requirement are designated (A) on the list of approved electives.
  - (Q) Quantification distribution. 6 or more credits in courses focused on statistical inference or quantitative social science methodology. Courses approved as meeting this requirement are designated (Q) on the list of approved electives. *(A Political Science Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Political Science Ph.D.)*
  - (C) Computational / informational distribution. 6 or more credits in courses focused on computation, collection, management, processing, or interaction with electronic data, especially at scale. Courses approved as meeting this requirement are designated (C) on the list of approved electives.
  - (S) Social distribution. 6 or more credits in courses with substantial content on the nature of human interaction and/or the analysis of data derived from human interaction and/or the social context or ethics or social consequences of social data analytics. Courses approved as meeting this requirement are designated (S) on the list of approved electives. *(A Political Science Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Political Science Ph.D.)*
  - Cross-departmental distribution.
    - 3 or more credits in approved courses with the prefix STAT or that of a primarily social science department. *(A Political Science Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Political Science Ph.D.)*
    - 3 or more credits in approved courses with the prefix IST, GEOG, or that of a primarily computer science or engineering department.
    - 6 or more credits in approved courses outside Political Science.
    - 3 or fewer credits in approved courses at the 400-level.

Students or faculty may request that the Social Data Analytics Committee consider approval of elective designations for any course, including temporary approvals for experimental or variable-title courses. Students are encouraged to take interdisciplinary courses that carry multiple (A), (Q), (C), (S) designations, as well as to select SO DA electives that also meet requirements of the primary program. In particular, the 12 elective credits can be met with as few as 6 credits of
appropriately chosen course work. Within this framework, final course selection is determined by the student in consultation with academic advisers from Political Science and Social Data Analytics. There is no formal maximum number of credits from the primary PL SC degree that can be double-counted toward the SO DA degree. For those meeting the SO DA elective requirement with the minimum of 12 credits, the outside-program minimum effectively limits the number of primary degree PL SC credits that count toward SO DA at 6. Advising committees may limit the number of credits taken for the SO DA degree that can count toward home degree requirements.

Candidacy Committee and Exam
The candidacy examination committee will be composed in accordance with rules of the Political Science Ph.D. and will include at least one graduate faculty member from the Social Data Analytics Program. Faculty member who hold appointments in both programs’ graduate faculty may serve in a combined role.

The dual-title degree will be guided by the Candidacy Exam procedure of the Political Science graduate program. The candidacy exam for the dual-title degree may be given after at least 18 postbaccalaureate credits have been earned in graduate courses; it must be held within three semesters (summer sessions do not count) of entry into the Political Science graduate program. There will be a single candidacy examination to assess whether the student should be admitted into Ph.D. candidacy in both Political Science and Social Data Analytics.

The Social Data Analytics Program maintains a list of recommended background and skills that it recommends students have in place by the time they begin the interdisciplinary course work required to complete the Social Data Analytics degree. The candidacy exam is the appropriate setting for assessing the student’s preparation for the interdisciplinary work of the dual-title Ph.D. in Political Science and Social Data Analytics.

Doctoral Committee Composition
The doctoral committee must conform to all requirements of the primary program and the Graduate Council. In accordance with Graduate Council policy, the doctoral committee of a Political Science and Social Data Analytics dual-title doctoral degree student must include at least one member of the Social Data Analytics graduate faculty. Faculty members who hold appointments in both programs’ graduate faculty may serve in a combined role. The Social Data Analytics representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit Member, if his or her primary appointment is in an administrative unit outside the unit in which the dissertation adviser's primary appointment is held.

If the chair of the committee representing Political Science is not also a member of the graduate faculty in Social Data Analytics, the member of the committee representing Social Data Analytics must be appointed as co-chair. The ideal arrangement then, is for a member of the Social Data Analytics graduate faculty with primary appointment in Political Science to act as dissertation chair, and for a member of the Social Data Analytics graduate faculty with primary
appointment outside the administrative unit of the primary program to act as both Outside Field Member and Outside Unit Member.

**Comprehensive Exam**

After completing all course work, doctoral candidates for the dual-title doctoral degree in Political Science and Social Data Analytics must pass a comprehensive examination that includes written and oral components.

Written components will be administered on a candidate’s major Political Science subfield and Social Data Analytics (acting as a first minor field). The Social Data Analytics representative(s) on the student’s doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

The oral component of the comprehensive involves the defense of a dissertation prospectus, which must contain substantial Social Data Analytics content.

**Dissertation and Dissertation Defense**

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Political Science and Social Data Analytics.

**Dual-Title Graduate Degree in Political Science and Women’s Studies**

Graduate students with research and teaching interests in gender and politics may apply to the dual-title master’s or doctoral degree program in Political Science and Women’s Studies. The goal of the dual-title graduate degree program in Political Science and Women’s Studies is to enable graduate students from Political Science to acquire the knowledge and skills of their major area of specialization in Political Science while at the same time gaining the perspective of Women’s Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title graduate degree in Women’s Studies will add value to their degree and their status as candidates. It will produce excellent political scientists who are experts in Women’s Studies as well. The dual-title graduate degree in Political Science and Women’s Studies will build curricular bridges beyond the student’s major field so as to provide unique training for the interdisciplinary scholar.

Additional details of the dual-title program are available at the [Department of Women's, Gender, and Sexuality Studies website](#).

**Admission Requirements**

Requirements listed here are in addition to requirements stated in the [GENERAL](#).
INFORMATION section of the Graduate Bulletin.

Students must apply and be admitted to the graduate program in Political Science and the Graduate School before they can apply for admission to the dual-title degree program in Women’s Studies. Doctoral students must apply and be admitted to the dual-title Ph.D. program prior to taking the candidacy exam.

Students will be admitted to graduate study in Women’s Studies by an admissions committee of Women’s Studies-affiliated faculty. The Women’s Studies program will follow the timetable and admission requirements of Political Science. Applicants should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale) and appropriate course background should be considered for study. Prospective students seeking admission to the dual-title degree program must write a statement of purpose that addresses the ways in which their research and professional goals will reflect an interest in interdisciplinary and feminist research.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

The Dual-Title Master of Arts Degree in Political Science and Women’s Studies (30 credits plus essay)

- 12 credits in major political science field (including proseminar)
- Political Science 501: Methods of Political Analysis (3)
- Political Science 502: Statistical Methods for Political Research (3)
- Women’s Studies 501: Feminist Perspectives in Research and Teaching (3)
- Women’s Studies 502: Global Perspectives on Feminism (3)
- Women’s Studies 507: Feminist Theory (3)
- 3 elective credits in Women’s Studies approved courses (may double count if in political science field)
- Oral exam and M.A. essay defense as specified in the Department of Political Science Graduate Student Handbook.

Of these requirements, at least 21 credits must be at the 500 level. In addition there is a 6-credit maximum for independent study and a 10-credit maximum for transfer credits. For more information, refer to the Transfer Credit section in the Graduate Bulletin. The student is expected to conduct research for the M.A. essay on a Women’s Studies topic.
For the dual-title Master of Arts degree in Political Science and Women’s Studies, the student’s committee will include at least one Women’s Studies-affiliated faculty member.

The Dual-Title Ph.D. Degree in Political Science and Women's Studies (60 credits)*

- 15 credits in major political science field (including proseminar)
- 9 credits in 2nd minor political science field
- Political Science 501: Methods of Political Analysis (3)
- Political Science 502: Statistical Methods for Political Research (3)
- Political Science 503: Multivariate Analysis for Political Research (3-6)
- Women's Studies 501: Feminist Perspectives in Research and Teaching (3)
- Women's Studies 502: Global Perspectives on Feminism (3)
- Women's Studies 507: Feminist Theory (3)
- 9 elective credits in Women's Studies approved courses (may double count if in political science field)
- Ph.D. candidacy exam in major political science field, plus portfolio of Women's Studies work.

Of these requirements at least 51 credits must be at the 500 level. In addition there is a 12 credit maximum for independent study.

Candidacy Examination Committee Composition: The candidacy examination committee for the dual-title degree will be composed of graduate faculty from Political Science and at least one graduate faculty member from the Women’s Studies Program. The designated dual-title faculty member may be appointed from Political Science if that person holds a formal appointment with the Women’s Studies program.

Candidacy Exam: In accordance with Graduate Council policy, the candidacy examination will assess candidacy for both the primary and the dual-title program. The candidacy exam for the dual-title degree may be given after at least 18 postbaccalaureate credits have been earned in graduate courses; it must be taken within three semesters (summer sessions do not count) of entry into the Political Science graduate program.

Doctoral Committee Composition: In accordance with Graduate Council policy, the doctoral committee of a Political Science and Women’s Studies dual-title doctoral degree student must include at least one member of the Women’s Studies graduate faculty. Faculty members who hold appointments in both programs’ graduate faculty may serve in a combined role. The
Women’s Studies representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit Member, if his or her primary appointment is in an administrative unit outside the unit in which the dissertation adviser's primary appointment is held.

If the chair of the committee representing Political Science is not also a member of the graduate faculty in Women’s Studies, the member of the committee representing Women’s Studies must be appointed as co-chair.

Comprehensive Exam: After completion of required course work, doctoral candidates for the dual-title doctoral degree must pass a comprehensive examination. The dual-title faculty representative on the student’s doctoral committee will participate in the writing and evaluation of the examination.

Dissertation and Dissertation Defense: Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in their home discipline and Women’s Studies.

Students must pass the Ph.D. candidacy and comprehensive exams and have their dissertation proposal approved as specified in the Department of Political Science Graduate Student Handbook.

* The Department of Political Science requires a minimum total of 60 postbaccalaureate credits for the Ph.D. At least 45 credits, exclusive of the dissertation, must be in political science. Course work accepted for the M.A. in Political Science at Penn State will count toward the department’s 60-credit requirement. In the case of students who have earned credits in an advanced degree program at another university or in another department at Penn State, a maximum of 30 credits may count toward the 60-credit departmental requirement.

Other Relevant Information

Penn State is a member of the Committee on Institutional Cooperation (CIC), an association of the Big Ten universities and the University of Chicago. The CIC sponsors the Traveling Scholars program, which provides doctoral-level students with an opportunity to study at another CIC university. In addition to participating in CIC programs, the department sponsors attendance at the ICPSR Summer program at the University of Michigan.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin.
Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

POLITICAL SCIENCE (PL SC) course list
VII. Proposed Revision, Political Science Graduate Student Handbook

The Handbook already accurately describes how general requirements apply to dual-title students in existing programs in African Studies, Asian Studies, and Women’s Studies. As a result, the only revision required is insertion of a new section “L”, entitled “Dual-title Doctoral Degree in Political Science and Social Data Analytics” between existing parallel sections on programs in Asian Studies and Women’s Studies, and relettering of the Women’s Studies section to “M.” The proposed new text, to be inserted beginning on page 22, is highlighted below:

L. Dual-Title Doctoral Degree in Political Science and Social Data Analytics

Political Science doctoral students seeking to attain and be identified with an interdisciplinary array of tools, techniques, and methodologies for social data analytics, while maintaining a close association with political science, may apply to pursue a dual-title Ph.D. in Political Science and Social Data Analytics.

Social data analytics is the integration of social scientific, computational, informational, statistical, and visual analytic approaches to the analysis of large or complex data that arise from human interaction. The dual-title Ph.D. aims to enable scientists who expand the capability of social data analytics, and use those capabilities creatively to answer important social scientific questions and to address grand social challenges, in both academic and nonacademic settings.

The Department of Political Science and the Social Data Analytics Program offer a dual-title Ph.D. in Political Science and Social Data Analytics. Official application to and enrollment in the program is handled through the Social Data Analytics program.

Students enrolled in this dual-title Ph.D. choose Social Data Analytics as their first minor field. Upon acceptance by the Social Data Analytics admissions committee, the student is also assigned an academic adviser from the Social Data Analytics graduate faculty. Students must satisfy course work requirements with 18 credits in Social Data Analytics related course work, 12 credits of which is generally over and above standard requirements for the Political Science Ph.D.

The specific course requirements are as follows:

- 6 credits in core interdisciplinary seminars: SO DA 501 and SO DA 502
- 12 or more elective credits in Social Data Analytics from a list of courses maintained by the Social Data Analytics Committee. Collectively the elective credits must satisfy distribution requirements, as listed in the Graduate Degree Bulletin. A total of 6 approved elective credits meeting the (S) [Social] and (Q) [Quantification] minimum distributions are generally met by fulfillment of the Political Science Ph.D. requirements. As a result, the elective requirement is met through 6 or more credits in approved courses meeting the following requirements:
  - (A) Core analytics distribution. 3 or more credits in courses focused on statistical learning, machine learning, data mining, or visual analytics. Courses approved as meeting this requirement are designated (A) on the list of approved electives.
  - (C) Computational / informational distribution. 6 or more credits in courses focused on computation, collection, management, processing, or interaction with electronic data, especially at scale. Courses approved as meeting this requirement are designated (C) on the list of approved electives.
  - 3 or more credits in approved courses with the prefix IST, GEOG, or that of a...
primarily computer science or engineering department.

- 6 or more credits in approved courses outside Political Science.
- 3 or fewer credits in approved courses at the 400-level.

There is no formal maximum number of credits from the primary PL SC degree that can be double-counted toward the SO DA degree. For those meeting the SO DA elective requirement with the minimum of 12 credits, the outside-program minimum effectively limits the number of primary degree PL SC credits that count toward SO DA at 6. Adopting programs and advising committees may limit the number of credits taken for the SO DA degree that can count toward home degree requirements.

In accordance with procedures described in the Graduate Bulletin and elsewhere in this handbook, a representative of the Social Data Analytics faculty will serve on the student’s candidacy committee, comprehensive exam committee, and doctoral committee. The dissertation must be on a topic appropriate to both political science and Social Data Analytics.

For more detailed information about the dual-title program, please contact the Social Data Analytics program.
Appendix A: Courses Approved as Social Data Analytics Electives

Approved Social Data Analytics Electives with Designation (S)

The following courses are approved as carrying at least the (S) designation without further approval required. Students or faculty may request that the Social Data Analytics Program Committee consider any additional designations for any particular version of these courses.

CRIM  500, 501, 512, 558
HD FS  501, 502, 506, 509, 520, 522, 524, 525, 528, 529, 531, 532, 533, 537, 539, 540, 544, 546, 549, 565, 569, 577, 579
PL SC  534, 540, 541, 542, 550, 551, 552, 553, 554, 555, 556, 560, 561, 563, 564, 565, 566, 586
SOC    501, 502, 512, 521, 522, 523, 524, 525, 526, 527, 528, 529, 531, 532, 533, 534, 537, 538, 544, 546, 551, 553, 557, 560, 584
GEOG   501B, 501C, 520
IST     520, 521, 526

Approved Social Data Analytics Electives with Designation (Q)

The following courses are approved as carrying at least the (Q) designation without further approval required. Students or faculty may request that the Social Data Analytics Program Committee consider any additional designations for any particular version of these courses.


Approved Social Data Analytics Electives with Designation (C)

The following courses are approved as carrying at least the (C) designation without further approval required. Students or faculty may request that the Social Data Analytics Program Committee consider any additional designations for any particular version of these courses.

CSE     520, 522, 530, 531, 532, 537, 541, 542, 563, 565, 588
GEOG    501D, 560, 565, 583, 584, 585
IST     441, 510
Approved Social Data Analytics Electives with Designations (Q) and (S)

The following courses are approved as carrying at least the (Q) and (S) designations without further approval required. Students or faculty may request that the Social Data Analytics Program Committee consider any additional designations for any particular version of these courses.

CRIM 515
PL SC 501, 502, 503, 504, 505, 506, 518, 519
HD FS 503, 516, 519, 523, 526, 527, 528, 530, 534, 536
SOC 513, 515, 518, 519, 572, 573, 574, 575, 576, 577, 578, 579
STAT 507, 509

The following 597s have received temporary Q and S designations:

HD FS Person-Specific EMA (Molenaar)
HD FS Intensive Longitudinal Data (Ram)
PL SC Causal Inference (Keele)
PL SC Measurement Theory (Fariss)
SOC Causal Analysis (Firebaugh)
SOC Seminar in Longitudinal Analysis (Johnson)

Approved Social Data Analytics Electives with Designations (C) and (S)

The following courses are approved as carrying at least the (C) and (S) designations without further approval required. Students or faculty may request that the Social Data Analytics Program Committee consider any additional designations for any particular version of these courses.

GEOG 571, 588, 591
IST 530, 555

The following 597s have received temporary C and S designations:

GEOG Spatial Thinking* (Klippel)
**Approved Social Data Analytics Electives with Designations (Q) and (C)**

The following courses are approved as carrying at least the (Q) and (C) designations without further approval required. Students or faculty may request that the Social Data Analytics Program Committee consider any additional designations for any particular version of these courses.

**STAT**  540, 555, 557*, 558*, 561  
**CSE**  550, 551, 552, 553, 554, 555, 556, 557, 560, 561*, 562, 564, 583, 584, 585, 586  
**GEOG**  586  
**IST**  556, 557*, 558*, 561*, 562

The following 597s have received temporary (Q) and (C) designations:

**STAT**  Spatial Models (Huran)  
**CSE**  Advanced Big Data Analytics* (Kifer)  
**CSE**  Data-Mining and Analytics* (Lee)  
**CSE**  Graph Mining (Madduri)  
**CSE**  Regularity on Interdisciplinary Large Data Sets (Liu)  
**CSE**  Vision-Based Tracking (Collins)  
**GEOG**  Geoinformatics (Cervone)  
**IST**  Big Data Fundamentals (Yen / Giles)  
**IST**  Principles of Machine Learning* (Honaver)

*These courses also satisfy the core analytics requirement (A).*
Approved Social Data Analytics Electives with Designations (Q), (C), and (S)

The following courses are approved as carrying (Q) (C) and (S) designations without further approval required. Students or faculty may request that the Social Data Analytics Program Committee consider any additional designations for any particular version of these courses.

The following variable title courses, 597, unless otherwise indicated, have received temporary (Q) (C) and (S) designations:

- HD FS Bayesian Methods for Human Development & Family Studies (Oravecz)
- HD FS Intro to Data Mining for Human Development & Family Studies* (Brick)
- PL SC Big Data and the Law (Zorn)
- PL SC Big Data Approaches to the Study of Political Representation (Monroe) [PL SC 551]
- PL SC Political Events Data (Schrodt)
- PL SC Robust Methods* (Honaker)
- SOC Methods of Social Network Analysis (Felmlee)
- STAT Statistical Privacy in Large Databases (Slavkovic)
- CSE Data Privacy, Learning and Statistical Analysis (Smith)
- CSE Social Network Data Analytics (Lee)
- GEOG Spatio-Temporal Analysis of Movement in Space (Andris) [GEOG 560]
- GEOG Visual Analytics: Leveraging Geo-Social Data* (MacEachren / Hardisty)
- IST Principles of Artificial Intelligence (Honaver)
- IST How the Mind Works (Reitter)
- IST Visualization and Advanced Analysis of Social Networks (Yen / Kropczynski)

* These courses also satisfy the core analytics requirement (A).
Appendix B: Social Data Core Course Descriptions & Recommended Background

Overview

The core seminars are organized around the metaphor used in BDSS-IGERT of the social data stack. The social data stack consists of three fuzzily boundaryed layers: the “data layer,” the “analytics layer,” and the “relevance layer” (Figure 1).

The data layer is comprised of the processes and technologies by which human interactions are translated into data about human interactions. This is material discussed in SO DA 501, offered in the spring semester, and typically taken in the fourth semester of the Ph.D.

The analytics layer is comprised of the processes and technologies by which social data are translated into knowledge about society. This is material discussed in SO DA 502, offered in the fall semester, and typically taken in the fifth semester of the Ph.D. (SO DA students must also take a focused seminar in a core approach to analytics: machine learning / statistical learning / data mining, or visual analytics.)

The relevance layer is comprised of the processes and technologies by which knowledge about society is translated into value for science or society. This is addressed in the SO DA seminars through a project orientation, both in evaluation and in the examples discussed with our guests throughout the courses.
Recommended Background for Social Data Analytics Course Work

Students will have a variety of backgrounds. Prior to beginning interdisciplinary course work to fulfill Social Data Analytics degree requirements, including SO DA 501 and 502, students are expected to have advanced (graduate) training in at least one of the component areas of Social Data Analytics, and a familiarity with basic concepts in the others.

With regard to specialization, students are expected to have advanced (graduate) training in ONE of the following.

(a) quantitative social science methodology and a discipline of social science (as would be the case for a second-year Ph.D. student in Political Science, Sociology, Criminology, Human Development and Family Studies, or Demography); OR
(b) statistics (as would be the case for a second-year Ph.D. student in Statistics); OR
(c) information science or informatics (as would be the case for a second-year Ph.D. student in Information Science & Technology, or a second-year Ph.D. student in Geography specializing in GIScience); OR
(d) computer science (as would be the case for a second-year Ph.D. student in Computer Science and Engineering).

This requirement is met as a matter of meeting home program requirements for students in the dual-title Ph.D., but may require additional course work on the part of students in other programs wishing to pursue the graduate minor.

With regard to general preparation, students are expected to have ALL of the following technical knowledge:

(a) basic programming skills (e.g., CMPSC 121 or equivalent); AND
(b) basic knowledge of relational databases and/or geographic information systems (e.g., IST 210 or GEOG 160, or equivalent); AND
(c) basic knowledge of probability, applied statistics, or social science research design (e.g., STAT 200, PL SC 309, SOC 207, or equivalent); AND
(d) basic familiarity with a substantive or theoretical area of social science (e.g., 300-level course work in political science, sociology, criminology, human development, psychology, economics, communication, anthropology, human geography, social informatics, or similar fields).

It is not unusual for students to have one or more gaps in this preparation. Students must work with Social Data Analytics advisers to develop a plan for timely remediation of any deficiencies, which generally does not require formal course work for students whose training and interests are otherwise appropriate for pursuit of the Social Data Analytics degree. Where possible this will be addressed at time if application to the Social Data Analytics program.
SO DA 501, Big Social Data: Approaches & Issues

This seminar addresses the interdisciplinary integration of computational, informational, statistical, visual analytic and social scientific approaches to the creation of data that are both "social" (about, or arising from, human interactions) and "big" (of sufficient scale, variety, or complexity to strain the informational, computational, or cognitive limits of conventional social scientific approaches to data collection or analysis).

Examples include text, image, audio, video, intensive spatial &/or longitudinal data, data with complex network, hierarchical &/or other relational information, data from distributed sensors and mobile devices, digitized archival data, and data exhaust from sources like social media. Issues include sources of social data, data structures and formats for social data, data collection and manipulation technologies, data provenance, data linkage and alignment, ethics and scientific responsibility in human subjects research, experimental and observational data collection design for causal inference, sampling design, measurement of latent social concepts, reliability and validity, search and information retrieval, nonrelational and distributed databases, and standards for data preservation and sharing.

The primary objective of the seminar is substantive interdisciplinary engagement with and integration of the tools, practices, language, and standards used in the collection and management of data in the component disciplines of the Social Data Analytics field.
SO DA 502, Social Data Analytics: Approaches & Issues

This seminar addresses the interdisciplinary integration of computational, informational, statistical, visual analytic and social scientific approaches to learning from data that are both "social" (about, or arising from, human interactions) and “big” (of sufficient scale, variety, or complexity to strain the informational, computational, or cognitive limits of conventional social scientific approaches to data collection or analysis).

Topics include alternative scientific models for learning from data (Bayesian inference, causal inference, statistical / machine learning, visual analytics, measurement modeling), analytics issues with big data (variable selection, parallel computing, algorithmic scaling, ensemble modeling, validation), analytics issues with particular structures and channels of social data (network data, geospatial data, intensive longitudinal data, text data), and issues of scientific responsibility and ethics in big social data.

The primary objective of the seminar is substantive interdisciplinary engagement with and integration of the tools, practices, language, and standards used to learn from data in the component disciplines of the Social Data Analytics field.
Graduate Council  
Program, Option, or Minor Proposal Form

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Curriculum Coordinator, University Faculty Senate, 101 Kern Graduate Building, University Park. The proposals will be transmitted to the Office of the Dean of the Graduate School for entry into the Graduate Council curricular review process; for more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

College/School: Liberal Arts
Department or Instructional Area: School of Labor and Employment Relations

New Graduate Program, Option, or Minor: [ ] Add
Designation of new graduate program: 
Classification of Instructional Programs (CIP) Code: 
Designation of new graduate option: 
Designation of new graduate minor: 

Indicate effective semester:
[ ] First semester following approval
[ ] Second semester following approval

Existing Graduate Program Option, or Minor: [ ] Change [ ] Drop
Current designation of graduate program: Human Resources and Employment Relations
Current designation of graduate option: 
Current designation of graduate minor: 

New designation of existing graduate program (if changing):
New designation of existing graduate option (if changing):
New designation of existing graduate minor (if changing):

Brief description of the change (if not noted above): addition of a BS Psych/MS HRER IUG program, changes to the MPS HRER program curriculum

Indicate effective semester:
[ ] First semester following approval
[ ] Second semester following approval

Submitted by Graduate Program Head

Paul Clark
Printed name
Date: 8/5/15
Signature

Noted by College/School Representative to Graduate Council Subcommittee on New and Revised Programs and Courses:

Lise Nelson
Printed name
Date: 8/10/15
Signature

Approved by College/School Dean/Chancellor (or Designee):

Eric Silver
Printed name
Date: 8/12/15
Signature
Recommended by Chair, Graduate Council Subcommittee on New and Revised Programs and Courses:

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<th>On Behalf of Luis Ayala</th>
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Recommended by Chair, Graduate Council Committee on Programs and Courses:

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Noted by Dean of the Graduate School:

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Proposal for Changes to the Human Resources and Employment Relations M.P.S and M.S.

The School of Labor and Employment Relations

College of the Liberal Arts

June 4, 2015

Contact

Dr. Paul F. Clark, Head
School of Labor and Employment Relations
(814) 865-0752
pfc2@psu.edu
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PROPOSED CHANGES

Integrated B.S. in Psych and M.S. in HRER

Objectives
We are proposing the addition of an Integrated Psychology (PSYBS) B.S. and Human Resources and Employment Relations (HRER) M.S. This five-year program is designed for academically-talented undergraduate Psychology baccalaureate students to obtain both the B.S. degree in Psychology and the M.S. degree in HRER in an intense, accelerated program of study. Students will develop expertise in the human resources and employment relations field beyond that provided by their Psychology B.S. degree. The undergraduate psychology curriculum allows students to study (1) personnel selection, (2) training and development, and (3) organizational psychology. The graduate curriculum provides for a more intensive, individualized, and focused examination of the human resources and employment relations field, including: (1) the roles employers, employees, employee organizations, and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship, (3) the laws that form the legal framework for the employee-employer relationship, (4) the tools needed to systematically analyze those complex issues and evaluate research relevant to those analyses, and (5) human resource management policies and practices that contribute to individual and organizational success. It also provides an opportunity for students to explore a concentrated sub-area of the HRER field in depth. The program culminates with the student either completing a thesis or master’s paper. Upon completion of the integrated degree, students will be well-positioned to assume positions of greater responsibility in Industrial/Organizational Psychology, Human Resource Management, Employment Relations, and related careers as a result of the advanced knowledge and expertise gained through the program.

A minimum of 37 credits is needed to complete the M.S. degree in HRER. Twelve credits (400-level and above) can apply to both undergraduate and graduate degrees; six of these must be at the 500 or 800 level.

Justification
The integrated Psychology B.S./HRER M.S. degree program provides an additional career opportunity for Psychology majors with strong academic records. While a Psychology major can prepare students for careers in human resource management and employment relations, many Psychology undergraduate students do not do enough course work, or master enough skills, to be competitive for professional careers in these fields. In addition to providing advanced course work in human resource management and employment relations, students in the Integrated Psychology B.S./HRER M.S. program will be eligible for internships through the School of Labor and Employment Relations, further increasing their career knowledge, personal capabilities, and competitiveness for jobs.

Most of the current incoming HRER graduate students come from other universities and in many cases have majored in subject areas other than labor, employment relations, and human resources. In contrast, the high-caliber Psychology baccalaureate students, who have completed
course work in the related field of Industrial/Organizational Psychology, are in a position to build on their knowledge and accelerate their program of study to obtain the B.S./M.S. in a shortened amount of time. These students will benefit from a challenging curriculum that builds on their Industrial/Organizational Psychology background, and, as has been evidenced by our existing integrated LER B.S./HRER M.S. degree students, they will be aggressively recruited for employment in the HRER field.

The integrated degree will strengthen the graduate program by enrolling some of the strongest Psychology undergraduates. The academic abilities of the integrated degree students will contribute to the rigor and quality of our existing program and broaden the disciplinary breadth of students in the program. The addition of a small cohort (5-10 students per year) of integrated degree students will not tax our current faculty.

Central to the College of the Liberal Arts' strategic plan is the continued strengthening of the academic programs it offers. Progress in this regard is measured by a number of factors, including the quality of students a program is able to recruit, its reputation in its field, and its ability to place its graduates. The creation of an Integrated Psychology B.S./HRER M.S. will make a small, but important contribution in each of these regards. First, it will provide another tool for recruiting high-quality students into the HRER master’s degree program. Second, it will help the Psychology Department better meet the needs of its undergraduate students by providing an opportunity for top students to obtain a highly regarded master’s degree in only one additional year of study and thereby enhance their career opportunities. And third, by increasing the attractiveness of our HRER students in the labor market because of the strength of Penn State’s Psychology program, it will ensure that graduates of the integrated Psychology B.S. and HRER M.S. will be in high demand.

New Courses
No new courses will be proposed as a result of this offering. A list of the Labor and Employment Relations (LER) and Human Resource and Employment Relations (HRER) courses needed to support the proposed IUG degree program is available in the University Course Descriptions at:

http://bulletins.psu.edu/graduate/courses/H/HRER/

and

http://bulletins.psu.edu/undergrad/courses/L/LER (only the 400-level courses may be used to double-count for the IUG or to count toward the graduate degree).

Reduced Course Load
Twelve (12) credits required for the M.S. degree may be applied to both the undergraduate and graduate degree programs. A minimum of 6 of these credits must be at the 500 or 800 level.

Plan of Study
Students must be enrolled in the PSYCH B.S. program, pursuing the Business Option, with the successful completion of PSYCH 281, Introduction to Industrial-Organizational Psychology, AND one of the following: PSYCH 482, Selection and Assessment in Organizations, PSYCH 484, Work Attitudes and Motivation, or PSYCH 485, Leadership in Work Settings.
Students must present a departmentally approved plan of study in the application process. The plan of study is to be determined in consultation with the student’s undergraduate adviser and Graduate Director. (See Appendix B.)

**Advising**

Upon acceptance to the IUG program, the student will be assigned a graduate adviser from the School of Labor and Employment Relations who will work in conjunction with their already established Psychology undergraduate adviser. Along with both advisers, the student will plan the remainder of his/her undergraduate studies to complement the proposed graduate plan of study; semester reports must be submitted to Graduate Enrollment Services in a timely fashion (each semester). Students will be advised to first fulfill basic undergraduate requirements so that they can complete the undergraduate degree if, for some reason, they are not able to complete the graduate program.

**Accreditation**

There are no plans to seek accreditation for the IUG Psychology B.S. /Human Resources and Employment Relations M.S. degree.

**Scheduling Recommendations**

Students shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree.

**Semester standing 3 – 6**

Students should complete at least two courses within the Business Option, group 2, section C (Labor Relations) - these credits will be double counted.

**Semester standing 7 – 8**

Students complete two graduate classes (6 credits; it is recommended that 3 of these credits be HRER 504 or HRER 505); students complete HRER 510 (1 credit seminar); an internship is recommended at some time between semesters 6 and 9.

**Semester standing 9 – 10**

Students who have chosen to complete the research paper:

- Students complete 12 graduate credits each semester; research paper.

Students who have chosen to complete a thesis:

- Students complete 12 graduate credits each semester (to include 6 credits of HRER 600); thesis.
Proposed New Course Requirement for the M.P.S. HRER Degree:
860, Ethical Decision Making for HR Practitioners

Explanation of Proposed Changes / Justification

Currently the School of Labor and Employment Relations does not require its M.P.S. HRER students to take an Ethics class. There is an existing course in our curriculum, (HRER 860, Ethical Decision Making for HR Practitioners). We are proposing that all M.P.S. students be required to take HRER 860 to receive their degree. Since LER 460, Human Resource Ethics, is a required course in the LER B.S. degree, we will not require students to complete HRER 860 if they are enrolled in the LER B.S. / HRER M.P.S. program.

There have been substantial changes in the attention that those within the HRER community worldwide have paid to the issue of Ethics. Organizations in every industry have been confronted with difficult moral issues that are not easily resolved without a clear understanding of and skills associated with the concept of ethical reasoning. Alumni have frequently commented on the need to ensure that every graduate be prepared to address such problems.

In addition, there is an increasingly large amount of research and writing suggesting the pivotal role that HRER practitioners play in helping organizations address this problem. How HRER staff select, train, evaluate, and compensate employees at all levels (including managerial) can make an important difference in how those employees behave when confronted with moral quandaries. The increasingly large role that HR plays in strategic corporate decision making is another arena in which ethical problems emerge. Again, HRER staff must be able to interject the types of caution that will allow the organization to consider all alternatives in a measured way, resulting in choices that properly connect the decision appropriately to all stakeholders, including the communities the decision affects.

In light of what our alumni and the literature of this field suggest, it is no longer feasible to hope some graduate students “might” study this subject. It is no less critical as part of the core curriculum than introductory courses in employment law or collective bargaining.

We also believe the changes proposed will help advance the College’s strategic goal of more effectively integrating ethics into our curriculum. This proposed change is also part of our School’s current strategic plan.

Effect on Electives in the M.P.S. Program

Currently M.P.S. students are required to take 11 three-credit classes, eight of which are required. The required courses are:

HRER 501: Labor and Employment Law
HRER 504: Seminar in Employment Relations
HRER 505: Seminar in Human Resources
HRER 800: International and Comparative Employment Relations
HRER 802: Organizations in the Workplace
HRER 816: Labor Market Analysis or HRER 825: Strategic Business Tools for HRER Practitioners
HRER 836: Diversity in the Workplace
HRER 894: Research Topics

Students have three elective courses they can take, one free elective and two which they use to complete a concentration in one of the following areas:

- Benefits and Compensation
- Labor and Collective Bargaining
- Employment and Labor Law
- Staffing, Training, and Development

Creating HRER 860 as a required course with no other change in the graduation requirements will leave students with no free elective. Regardless, we are not comfortable at this point increasing the number of required credits to graduate to 36, given the already significant cost of any graduate program. By the same token, the concentration is of value in that it provides students with in-depth study in one area of the discipline. It also helps students market themselves to employers as they enter the job market.

As a consequence, and given the very important need to add HRER 860 as a required class, we believe the best solution is require nine classes, leaving two electives that must be used for the concentration. There will be no free elective.

**HRER 803, Human Resources in Multinational Enterprises**

**Explanation of Proposed Changes/Justification**

Currently, HRER 800 (International and Comparative Employment Relations) is a required course for the M.P.S. in Human Resources and Employment Relations. We recently submitted a proposal to change the number, title, and description of HRER 800 to HRER 803. In January of 2014 the School of Labor and Employment Relations began developing a Graduate Certificate Program in International Human Resources and Employment Relations (IHRER). The certificate will be marketed to students who have an interest in and/or responsibilities for IHRER in U.S. companies, or companies in other countries with global operations. As we identified classes that would be necessary for that certificate, we included not only two new offerings that will be created, but two existing classes: LER 400 and HRER 800. LER 400 exists as a residential course and will be developed as an online offering through World Campus.

As we compared the original course description and related materials in the proposal we submitted for HRER 800 in 2007, we discovered that there have been minor changes in course focus that have occurred in response to changing literature and perspective surrounding the increasingly complex areas of international and global human resource practices. One of the changes is the more recent understanding of the “convergence/divergence” of comparative HR policies and practices. As a consequence, we determined that we should take this opportunity to update the original descriptive material already on file with the Graduate School. Updating this
description will also help to more carefully distinguish HRER 800 from other classes in the certificate program.

In our present curriculum we have courses addressing comparable topics that we would like to better align in the context of the course number system. For example, we presently teach LER 201, LER 401, and HRER 501. Each one of these courses is related to labor and employment law. In other words, the number sequence helps reinforce students’ understanding of course content.

At this point we are creating a new undergraduate elective, LER 403, International Human Resource Studies. In order to create a similar sequence, we would not only re-title the current HRER 800, but also renumber it: HRER 803, Human Resources in Multinational Enterprises. For the reasons mentioned above, we need to update the M.P.S. curriculum to reflect HRER 803 as a required course instead of HRER 800.

**New Concentrations Added to the Master of Professional Studies in HRER Program Curriculum**

**Explanation of Proposed Concentrations/Justification**

The M.P.S. in Human Resources and Employment Relations program currently offers 4 concentrations; Benefits and Compensation, Employment and Labor Law, Labor and Collective Bargaining, and Staffing and Training. We are proposing the addition of three new areas of concentration. These concentrations reflect increasing depth of our curriculum and will provide students with more choices to identify a relevant specialty given their desired career paths.

**International Human Resources and Employment Relations**

The proposed concentration in International Human Resources and Employment Relations (IHRER) is designed to provide HR practitioners and those with an interest in global HR business practices with a comprehensive understanding of the law, policy, and best practices necessary for effective management of global human resources, employment relations, and labor relations responsibilities. This is an area of concentration that is becoming increasingly important as both large and small organizations continue to expand their focus beyond their own national boundaries. Students would take the following courses to fulfill this concentration.

LER 403 - International Human Resource Studies

and

HRER 801 - Comparative and International Employment and Labor Law

or

LER 400 - Comparative Employment Relations Systems

**Ethics and Leadership**

There are numerous ways in which HRER scholars and practitioners study leadership. A growing area of focus concerns the ethical dimensions of leadership. Leaders will constantly be confronted with choices that require them to resolve conflicting moral challenges. For example, to choose to share certain information with a group of
employees as an expression of transparency might affect the organization’s ability to best serve its shareholders. Connecting ethical decision making with a concentration in leadership will help prepare HRER students to better assist organizations to resolve such moral quandaries. Students would take the following courses to fulfill this concentration.

**LER 464**- Communication Skills for Leaders in Groups and Organizations  
**and**  
**LER 409** - Leadership Development: A Life-Long Learning Perspective  
**or**  
**LER 465** - Collective Decision Making

HRER 860 will be a required course for M.P.S. students which in combination with the courses noted above would be required for the concentration. Integrated B.S. in LER and M.P.S in HRER students who have already taken LER 460 (a required undergraduate class in LER) will not be required to take HRER 860. The combination of either HRER 860 or LER 460 would also suffice for current M.P.S. students who began the program before HRER 860 was a required course.

**Labor Union Organization and Strategy**

The labor movement in the United States has played various roles in representing wage earners throughout history. Early in its development a primary way in which it supported wage earners was to provide mutual insurance benefits. For long periods labor unions have represented workers in bargaining with employers over wages, hours, and other terms and conditions of employment. In addition the labor movement has played an important role in American political life. This concentration will provide students who have an interest in the labor movement with the opportunity to study how unions as organizations structure and govern themselves, and how they make strategic choices when deciding on the various ways they can best serve their members. Students would take the following courses to fulfill this concentration.

**LER 466** – Labor Union Structure, Administration, and Governance  
**and**  
**LER 468** – American Labor Unions
CURRENT BULLETIN LISTING

Human Resources and Employment Relations (HRER)

Program Home Page

PAUL F. CLARK, Head
003 Keller Building
814-865-5425

Degree Conferred:

- M.S. in Human Resources and Employment Relations
- M.P.S. in Human Resources and Employment Relations
- Integrated B.S. in Labor and Employment Relations and M.S. in Human Resources and Employment Relations
- Integrated B.S. in Spanish and M.S. in Human Resources and Employment Relations (SPHRER)
- Integrated B.S. in Labor and Employment Relations and M.P.S in Human Resources and Employment Relations

The Graduate Faculty

Master of Science in Human Resources and Employment Relations

The Master of Science (M.S.) degree in Human Resources and Employment Relations (HRER) is a two-year program designed for students anticipating careers in some aspect of labor and human resources or labor-management relations. The program has the following objectives:

- provide students with an understanding of the roles employers, employees, employee organizations, and public policy makers play in the employment relationship;
- familiarize students with the complex personal and organizational issues inherent in the employment relationship;
- prepare students to systematically analyze complex issues and evaluate research results in the process of administering labor and human resource systems;
- prepare students for advanced graduate or professional training beyond the master's degree;
- prepare students for employment as practitioners in the field.

Admission Requirements
Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (post-secondary) degree that is deemed comparable to a four-year bachelor’s degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

Applicants to the MS HRER program:

- Must complete the Penn State Graduate degree application and submit the application fee
- Must submit a 2-3 page essay articulating career and educational goals that demonstrates the applicant’s written communication skills.
- Must submit scores from the Graduate Record Examinations (GRE) or the Graduate Management Admission Test (GMAT)
- Must submit Official transcript(s) of all institutions attended, Applicants with a 3.00 junior/senior grade-point average (on a 4.00 scale) will be considered for admission.
- The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). The minimum acceptable composite score for the IELTS is 6.5.
  - International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.
- Must submit three letters of recommendation sent from people who can assess adequately their likelihood of completing the graduate program.
- Must have completed successfully an undergraduate statistics course plus a minimum of 12 undergraduate credits in the social sciences as part of their baccalaureate degree.

Degree Requirements

Total Required Credits for the MS: 37 credits at the 400 level or higher; at least 18 must be at the 500 or 800 level, with at least 6 must be at the 500 level.

Core Courses (22 credits)

HRER 513(3), HRER 516(3)
Required course are offered once per academic year and elective courses at least once every two academic years.

Emphasis Courses (6 credits)
An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Students select an emphasis in consultation with their master's advisory committee.

**Elective Courses (3-9 credits)**

With the faculty adviser's approval, a student selects at least 3 or more elective credits, depending on the chosen option. Examples of suitable elective courses are: HRER 500, HRER 535, HRER 536, HRER 594, HRER 595, HRER 596, HRER 599; LER 411, LER 401, LER 444, LER 458Y; ECON 412, ECON 436W, ECON 571; EDLDR 565, EDLDR 574; HIST (LER) 555; MGMT 321, MGMT 523, MGMT 548; PSYCH 484, PSYCH 485, PSY 522; SOC 455, SOC 456, SOC 555.

**THESIS OPTION:**
The HRER thesis option is intended for students anticipating additional graduate education beyond the master's degree. It requires 37 credits, including a minimum of 30 at the 400 and 500 level, and a minimum of 6 600-level thesis credits. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations. A student's thesis should reflect the chosen emphasis.

**RESEARCH PAPER OPTION:**
The HRER research paper option is intended for students expecting to enter the labor market upon completion of the master's degree. It requires a minimum of 37 credits at the 400 and 500 level. For the degree, and overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations. A student's research paper should reflect the chosen emphasis.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER) course list**

**Master of Professional Studies in Human Resources and Employment Relations (MPS HRER)**

The MPS in Human Resources and Employment Relations (HRER) is a 33 credit program of study for professionals working in human resources/employment relations or considering a
career in some aspect of human resources and employment relations. The program will prepare students to:

- understand the roles that employers, employees, employee organizations and unions, and public policy makers play in the employment relationship;
- analyze the complex personal, legal, and organizational issues inherent in the employment relationship;
- understand the ethical dimensions of human resource and employment relations;
- analyze complex issues and evaluate research results in the process of administering labor and human resource systems;

Courses include the study of employment law, labor and employment relations, human resources, workplace organization, labor markets, ethics, and the employment relationship, recruiting/selection, compensation and benefits, workforce development, and diversity in the workplace.

The program highlights the changing nature of the HRER field, including the impact of the globalization of private and public organizations and the growing importance of diversity in the workforce. It culminates in a capstone class in which students will demonstrate their understanding of the curriculum and apply it to their professional areas of interest. Upon completion of the MPS HRER, students will be equipped to work as professionals in human resource management, employment relations, and general management with private employers, unions, government agencies, and non-profit organizations.

Students pursuing the MPS in HRER are required to complete a concentration designed to provide the student an opportunity to develop expertise in a specific area of human resources and employment relations. The focused coursework should make the degree more relevant to potential students and add value to the degree from the student's perspective.

Students will choose and complete one concentration which will include 6 credits beyond the 24 required course credits. Double counting 6 required credits, including the Research Project, the concentration would be 12 credits of coursework in a particular area of HRER. An additional 3 elective credits chosen from LER, HRER, or WFED courses must also be completed. Students will be required to complete the capstone project in their area of concentration. (For example, students choosing the Benefits and Compensation concentration would be required to complete a capstone project that focused on some aspect of benefits and compensation).

**Admission Requirements**

In order to enter the MPS in HRER, applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Students who do not have a GPA of at least 3.0 will be considered on a case-by-case basis depending on the quality of their overall application. Applicants who are still completing their baccalaureate requirements at the time of application may be admitted to the Graduate
School provisionally, based on the awarding of the baccalaureate degree. Students are also expected to have a minimum of two years of full-time work experience prior to admission.

Admissions decisions for the program are based on the quality of the applicant's credentials. The decisions are based on a review of the complete application portfolio. During the admission process, students who are better suited for another graduate level program will be encouraged to apply to the appropriate program. Applicants to the MPS HRER must submit the following materials:

- Penn State graduate degree application form and application fee;
- A 2-3 page essay articulating career and educational goals that demonstrates the applicant's written communication skills. Documentation of a minimum of two years of full-time work and a resume should be attached as a supplement;
- Three letters of recommendation that attest to the applicant's readiness for graduate study and document the requisite minimum of two years of work experience;
- Official transcript(s) of all institutions attended;
- The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). The minimum acceptable composite score for the IELTS is 6.5.
  - International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

*Graduate Record Examination (GRE) scores are not required.*

**Degree Requirements**

Total Required Credits for the M.P.S.: 33 credits at the 400 level or higher; at least 18 credits must be at the 500 or 800 level, with at least 6 credits at the 500 level

**PRESCRIBED COURSES:** 24 credits

**HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER)**

501. Labor and Employment Law (3 credits)
504. Seminar in Industrial Relations (3 credits)
505. Seminar in Human Resources (3 credits)
800. International Context of HRER (3 credits)
802. Organizations in the Workplace (3 credits)
816. Labor Market Analysis (3 credits)
or
825. Strategic Business Tools for HRER Professionals (3 credits)
836. Diversity in the Workplace (3 credits)
894. Research Topics (3 credits)

AREAS OF CONCENTRATION (student must complete one)

--Benefits and Compensation
LER 424. Employment Compensation (3 credits)
LER 425. Employment Benefits (3 credits)

--Employment and Labor Law
LER 401. Law of Labor-Management Relations (3 credits)
HRER 811. Labor and Employment Law II (3 credits)

--Labor and Collective Bargaining
LER 401. Law of Labor-Management Relations (3 credits)
LER 435. Labor Relations in the Public Sector (3 credits)

--Staffing, Training, and Development
LER 426 Staffing and Training (3) or WF ED 471 Training in Industry and Business (3 credits)
WF ED 573 Needs Assessment for Industrial Trainers (3 credits)

ELECTIVE COURSES: 9 credits
Select 6 credits in area of concentration.
Select an additional 3 credit course from LER, HRER, or WF ED courses listed below.

LABOR AND EMPLOYMENT RELATIONS (LER)
401. Law of Labor-Management Relations (3 credits)
424. Employment Compensation (3 credits)
425. Employment Benefits (3 credits)
426. Staffing and Training (3 credits)
435. Labor Relations in the Public Sector (3 credits)
444. Occupational Health: Policy and Practices (3 credits)
445Y. Politics of Affirmative Action (3 credits)
460. Human Resources Ethics (3 credits)
464. Communication Skills for Leaders in Groups and Organizations (3 credits)
472. Work-Life Practices and Policies (3 credits)

HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER)
811. Labor and Employment Law II (3 credits)
816. Labor Market Analysis (3 credits)
825. Strategic Business Tools for HRER Professionals (3 credits)
WORKFORCE EDUCATION AND DEVELOPMENT (WF ED)
471. Training in Industry and Business (3 credits)
573. Needs Assessment for Industrial Trainers (3 credits)

Integrated B.S. in Labor and Employment Relations and M.S. in Human Resources and Employment Relations

The integrated LER B.S. and HRER M.S. is a five-year program designed for academically talented baccalaureate students to obtain both the B.S. and the M.S. degrees in LER and HRER with five years of study. Students will develop expertise in the human resources and labor relations fields beyond the B.S. degree. The undergraduate curriculum educates students about (1) the roles of employers, employees, employee organizations and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship (3) and how to systematically analyze those complex issues and evaluate research relevant to those analyses. The graduate curriculum provides for more individualized, focused learning in a concentrated sub-area of the HRER field. The program culminates with an M.S. research paper. Upon completion of the integrated degree, students will enter the workforce with advanced knowledge and expertise gained from conducting and analyzing empirical work and participating in seminar-style classes.

Admission Requirements

The number of openings in the integrated B.S./M.S. program will be limited to undergraduates with strong academic records. Applicants to the integrated program:

1. must be enrolled in the LER B.S. program;
2. must complete the Penn State graduate degree application form and pay the application fee;
3. shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer of AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
4. should have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in the major;
5. must obtain letters of recommendation from the chairs of the Department’s undergraduate and graduate committees, and
6. must submit a writing sample, 2 transcripts, 1 letter of recommendation (in addition to those from the chairs of the Department’s undergraduate and graduate committees), and a career statement.

No GRE or GMAT scores are required for admission to the program.
Degree Requirements

**M.S. REQUIREMENTS:** 36* credits at the 400 level or higher; 18 credits must be at the 500 or 800 level, with at least 6 at the 500 level
[12 credits may be double counted; at least 6 must be at the 500 level]

*The M.S. degree requirement for the 1-credit course HRER 510 is waived for students accepted into this IUG degree program, as HRER 510 is intended to familiarize new students with the field and the department; it is anticipated that these IUG students already will have this foundation.

**PRESCRIBED COURSES:** (21 credits)
HRER 501(3), HRER 502(3), HRER 504(3), HRER 505(3), HRER 512(3)**, HRER 513(3)***, HRER 516(3)
**or other statistics course approved in advance by graduate director
***or other methods course approved in advance by graduate director

**ADDITIONAL COURSES:** (15 credits)
Select 15 credits from the following list in consultation with adviser (a maximum of 6 credits may be at the 400 level).

**Emphasis Courses (6 credits)**
An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Select 6 credits from the M.S. prescribed or additional courses in consultation with their adviser.

**Masters Research Paper or a Masters Thesis (6 credits)**
Students must complete either a Masters Research Paper or a Masters Thesis. Students choosing the Thesis option must complete 6 thesis research credits (HRER 600). These credits can be counted towards the 15 credits required from the M.S. Additional Courses section above.

**HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER) course list**
**LABOR AND EMPLOYMENT RELATIONS (LER) course list**

**Integrated B.S. in Spanish and M.S. in Human Resources and Employment Relations**

The integrated Spanish B.S. and HRER M.S. is a five-year program designed for highly qualified and motivated students seeking employment within a culturally diverse workplace. Students will develop basic skills in speaking, understanding, reading, and writing Spanish. Students will gain familiarity with Hispanic cultures through literature and the University’s international education
program, if they choose to have that experience. Students also will learn about (1) the roles that employers, employees, employee organizations, and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship, and (3) how to systematically analyze those complex issues and evaluate research relevant to those analyses.

For the B. S./M. S. degree in Integrated Spanish B.S. and Human Resources and Employment Relations M.S., a minimum of 154 credits is required. Twelve credits (400 level or above) can apply to both undergraduate and graduate degrees; at least 6 of these must be at the 500 level. Students can complete the B.S. in Spanish and not advance to the M.S. HRER degree if they desire.

**Admission Requirements**

The number of openings in the integrated B.S./M.S. program will be limited to undergraduates with strong academic records. Applicants to the integrated program:

- must be enrolled in the Spanish B.S. program
- must complete the Penn State graduate degree application form, and pay the application fee;
- shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
- should have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in the major;
- must obtain letters of recommendation from the chairs of the Department’s undergraduate and graduate committees, and
- must submit a writing sample, 2 transcripts, 1 letter of recommendation (in addition to those from the chairs of the Department’s undergraduate and graduate committees), and a career statement.

No GRE or GMAT scores are required for admission to the program.

**Degree Requirements**

**M.S. REQUIREMENTS:** 37 credits at the 400 level or higher; 18 credits must be at the 500 or 800 level, with at least 6 at the 500 level
[12 credits may be double counted; at least 6 must be at the 500 level]

**PRESCRIBED COURSES:** (22 credits)
HRER 501(3), HRER 502(3), HRER 504(3), HRER 505(3), HRER 510(1), HRER 512(3)*, HRER 513(3)**, HRER 516(3)
*or other statistics course approved in advance by graduate director
**or other methods course approved in advance by graduate director

ADDITIONAL COURSES: (15 credits)
Select 15 credits from the following list in consultation with adviser (a maximum of 6 credits may be at the 400 level).

Emphasis Courses (6 credits)
An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Select 6 credits from the M.S. prescribed or additional courses in consultation with their adviser.

Master’s Research Paper or a Master’s Thesis (6 credits)
Students must complete either a Master’s Research Paper or a Master’s Thesis. Students choosing the Thesis option must complete 6 thesis research credits (HRER 600). These credits can be counted towards the 15 credits required from the M.S. Additional Courses section above.

HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER) course list
LABOR AND EMPLOYMENT RELATIONS (LER) course list
SPANISH (SPAN) course list

Integrated B.S. in LER and M.P.S. in Human Resources and Employment Relations

The integrated LER B.S. and HRER M.P.S is a five-year program designed for academically talented World Campus baccalaureate students to obtain both the B.S. and the M.P.S. degrees in LER and HRER in an intense, accelerated program of study. Students will develop expertise in the human resources and employment relations field beyond the B.S. degree. The undergraduate curriculum introduces students to (1) the roles employers, employees, employee organizations and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship (3) the laws that form the legal framework for the employee-employer relationship, and (4) the tools needed to systematically analyze those complex issues and evaluate research relevant to those analyses. The graduate curriculum provides for a more intensive, individualized, and focused examination of the human resources and employment relations field. It also provides an opportunity for students to explore a concentrated sub-area of the HRER field in depth. The program culminates with a research project which is completed through the capstone course, HRER 894. Upon completion of the integrated degree, students will have gained advanced knowledge and expertise from conducting and analyzing empirical work and participating in online classes that can be directly applied to the workplace.
A minimum of 33 credits as described below is needed to complete the MPS degree in HRER. Nine credits (400 level and above) can apply to both undergraduate and graduate degrees; six of these must be at the 500 or 800 level.

**Admission Requirements**

Admissions decisions for the B.S. /M.P.S. program are based on the quality of the applicant's credentials. The decisions are made after a review of the complete application portfolio. The integrated B.S. /M.P.S. program will be limited to highly talented undergraduates. Applicants to the integrated program:

- must be enrolled in the LER B.S. program;
- must complete the Penn State graduate degree application and pay the application fee
- shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
- must have an overall GPA of 3.4 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.6 in the major;
- must submit 2 letters of recommendation from current or previous Penn State instructors and 1 additional letter of recommendation (should be professional or academic);
- must submit a writing sample, a resume, and 2-3 page essay articulating career and educational goals that demonstrates the applicant’s written communication skills;
- must present an approved plan of study (to be determined in consultation with the student’s undergraduate adviser and the Graduate Director, and to be signed by both); and
- must possess the equivalent of two years of full-time work experience prior to admission.

No GRE or GMAT scores are required for admission to the program.

**Degree Requirements**

The M.P.S. requires 33 credits at the 400 level or higher; at least 18 credits must be at the 500 or 800 level, with at least 6 credits at the 500 level.

Nine (9) of 33 credits can be double counted for B.S. and M.P.S. At least 6 of these must be at the 500 or 800 level.

**Prescribed Courses (24 credits)**

**Human Resources and Employment Relations (HRER)**

- 501. Labor and Employment Law (3 credits)
- 504. Seminar in Industrial Relations (3 credits)
- 505. Seminar in Human Resources (3 credits)
- 800. International Context of HRER (3 credits)
- 802. Organizations in the Workplace (3 credits)
- 816. Labor Market Analysis (3 credits)
  or
- 825. Strategic Business Tools for HRER Professionals (3 credits)
- 836. Diversity in the Workplace (3 credits)
- 894. Research Project (3 credits)

Areas of Concentration (one required)

Benefits and Compensation

- LER 424. Employment Compensation (3 credits)
- LER 425. Employment Benefits (3 credits)

Employment and Labor Law

- LER 401. Law of Labor-Management Relations (3 credits)
- HRER 811. Labor and Employment Law II (3 credits)

Labor and Collective Bargaining

- LER 401. Law of Labor-Management Relations (3 credits)
- LER 435. Labor Relations in the Public Sector (3 credits)

Staffing, Training, and Development

- LER 426. Staffing and Training (3 credits) or WF ED 471 Training in Industry and Business (3 credits)
- WF ED 573. Needs Assessment for Industrial Trainers (3 credits)

Elective Courses (9 credits)

Select 6 credits in area of concentration.

Select an additional 3-credit course from the following list of LER, HRER, and WF ED courses.

Labor and Employee Relations (LER)

- 401. Law of Labor-Management Relations (3 credits)
- 424. Employment Compensation (3 credits)
- 425. Employment Benefits (3 credits)
- 426. Staffing and Training (3 credits)
- 435. Labor Relations in the Public Sector (3 credits)
- 444. Occupational Health: Policy and Practice (3 credits)
- 445Y. Politics of Affirmative Action (3 credits)
• 460. Human Resource Ethics (3 credits)
• 464. Communication Skills for Leaders in Groups and Organizations (3 credits)
• 465. Collective Decision Making (3 credits)
• 472. Work-Life Practices and Policies (3 credits)

**Human Resources and Employee Relations (HRER)**

• 811. Labor and Employment Law II (3 credits)
• 816. Labor Market Analysis (3 credits)
• 825. Strategic Business Tools for HRER Professionals (3 credits)

**Workforce Education and Development (WF ED)**

• 471. Training in Industry and Business (3 credits)
• 573. Needs Assessment for Industrial Trainers (3 credits)

**Student Aid**

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the [STUDENT AID] section of the *Graduate Bulletin*.

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.
PROPOSED BULLETIN LISTING

Human Resources and Employment Relations (HRER)

Program Home Page

PAUL F. CLARK, Head
003 Keller Building
814-865-5425

Degree Conferred:

- M.S. in Human Resources and Employment Relations
- M.P.S. in Human Resources and Employment Relations
- Integrated B.S. in Labor and Employment Relations and M.S. in Human Resources and Employment Relations
- Integrated B.S. in Psychology and M.S. in Human Resources and Employment Relations
- Integrated B.S. in Spanish and M.S. in Human Resources and Employment Relations (SPhRER)
- Integrated B.S. in Labor and Employment Relations and M.P.S in Human Resources and Employment Relations

The Graduate Faculty

Master of Science in Human Resources and Employment Relations

The Master of Science (M.S.) degree in Human Resources and Employment Relations (HRER) is a two-year program designed for students anticipating careers in some aspect of labor and human resources or labor-management relations. The program has the following objectives:

- provide students with an understanding of the roles employers, employees, employee organizations, and public policy makers play in the employment relationship;
- familiarize students with the complex personal and organizational issues inherent in the employment relationship;
- prepare students to systematically analyze complex issues and evaluate research results in the process of administering labor and human resource systems;
- prepare students for advanced graduate or professional training beyond the master's degree; and
- prepare students for employment as practitioners in the field.
Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Applicants must hold either (1) a baccalaureate degree from a regionally-accredited U.S. institution or (2) a tertiary (post-secondary) degree that is deemed comparable to a four-year bachelor’s degree from a regionally-accredited U.S. institution. This degree must be from an officially-recognized degree-granting institution in the country in which it operates.

Applicants to the MSM.S. HRER program:

- Must complete the Penn State Graduate degree application and submit the application fee
- Must submit a 2-3 page essay articulating career and educational goals that demonstrates the applicant’s written communication skills.
- Must submit scores from the Graduate Record Examinations (GRE) or the Graduate Management Admission Test (GMAT).

- Must submit Official-official transcript(s) of all institutions attended. Applicants with a 3.00 junior/senior grade-point average (on a 4.00 scale) will be considered for admission. Exceptions to the minimum grade-point average may be made for students with special backgrounds, abilities, and interests.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). The minimum acceptable composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

- Must submit three letters of recommendation sent from people who can adequately assess adequately their likelihood of completing the graduate program.
- Must have successfully completed successfully an undergraduate statistics course plus a minimum of 12 undergraduate credits in the social sciences as part of their baccalaureate degree.
Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

Total Required Credits for the M.S. Requirements

-37 credits at the 400-level or higher; at least 18 must be at the 500 or 800 level, with at least 6 must be at the 500-level, of which at least 20 must be earned at the established graduate campus/center of the University where the program is offered. At least 18 credits in the 500 and 600 series, combined, must be included in the program. A minimum of 12 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major program. If a student chooses to write a thesis, at least 6 credits in thesis research (600 or 610) must be included in the program. If the student chooses the research paper option, at least 18 credits must be in 500-level courses.

Core Courses (22 credits)


Required courses are offered once per academic year and elective courses at least once every two academic years.

Emphasis Courses (6 credits)

An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Students select an emphasis in consultation with their master's advisory committee.

Elective Courses (3-9 credits)

With the faculty adviser's approval, a student selects at least 3 or more elective credits, depending on the chosen option. Examples of suitable elective courses are: HRER 500, HRER 535, HRER 536, HRER 594, HRER 595, HRER 596, HRER 599, LER 411, LER 401, LER 444, LER 458Y, ECON 412, ECON 436W, ECON 571; EDLDR 565, EDLDR 574; HIST (LER) 555; MGMT 321, MGMT 523, MGMT 548; PSYCH 484, PSYCH 485, PSY 522; SOC 455, SOC 456, SOC 555. A list of approved elective courses is maintained by the graduate program office.

Thesis Option

The HRER thesis option is intended for students anticipating additional graduate education beyond the master's degree. It requires 37 credits, including a minimum of 30 at the 400- and 500- and 800-level, and a minimum of 6 600-level thesis credits. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade
of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations, as described above. A student's thesis should reflect the chosen emphasis. The thesis must be accepted by the student's advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Research Paper Option:

The HRER research paper option is intended for students expecting to enter the labor market upon completion of the master's degree. It requires a minimum of 37 credits at the 400-, 500-, and 800-level. For the degree, and overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations as described above. A student's research paper should reflect the chosen emphasis.

Master of Professional Studies in Human Resources and Employment Relations (MPS- HRER)

The MPS in Human Resources and Employment Relations (HRER) is a 33 credit program of study for professionals working in human resources/employment relations or considering a career in some aspect of human resources and employment relations. The program will prepare students to:

- understand the roles that employers, employees, employee organizations and unions, and public policy makers play in the employment relationship;
- analyze the complex personal, legal, and organizational issues inherent in the employment relationship;
- understand the ethical dimensions of human resource and employment relations; and
- analyze complex issues and evaluate research results in the process of administering labor and human resource systems.

Courses include the study of employment law, labor and employment relations, human resources, workplace organization, labor markets, ethics, and the employment relationship, recruiting/selection, compensation and benefits, workforce development, and diversity in the workplace.

The program highlights the changing nature of the HRER field, including the impact of the globalization of private and public organizations and the growing importance of diversity in the workforce. It culminates in a capstone class in which students will demonstrate their understanding of the curriculum and apply it to their professional areas of interest. Upon completion of the MPS HRER, students will be equipped to work as professionals in human resource management, employment relations, and general management with private employers, unions, government agencies, and non-profit organizations.
Students pursuing the MPS in HRER are required to complete a concentration designed to provide the student an opportunity to develop expertise in a specific area of human resources and employment relations. The focused coursework should make the degree more relevant to potential students and add value to the degree from the student's perspective.

Students will choose and complete one concentration which will include 6 credits beyond the 24 required course credits. Double counting 6 required credits, including the Research Project, the concentration would be 12 credits of coursework in a particular area of HRER. An additional 3 elective credits chosen from LER, HRER, or WF ED courses must also be completed. Students will be required to complete the capstone project in their area of concentration. (For example, students choosing the Benefits and Compensation concentration would be required to complete a capstone project that focused on some aspect of benefits and compensation).

**Admission Requirements**

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. In order to enter the MPS in HRER, applicants must hold either (1) a baccalaureate degree from a regionally-accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally-accredited U.S. institution. This degree must be from an officially-recognized degree-granting institution in the country in which it operates.

Students who do not have a GPA of at least 3.0 will be considered on a case-by-case basis depending on the quality of their overall application. Applicants who are still completing their baccalaureate requirements at the time of application may be provisionally admitted to the Graduate School provisionally, based on the awarding of the baccalaureate degree. Completion of admission in such cases is dependent upon receipt of the missing credentials. Students are also expected to have a minimum of two years of full-time work experience prior to admission.

Admissions decisions for the program are based on the quality of the applicant's credentials. The decisions are based on a review of the complete application portfolio. During the admission process, students who are better suited for another graduate level program will be encouraged to apply to the appropriate program. Applicants to the MPSM.P.S. HRER must submit the following materials:

- A 2-3 page essay articulating career and educational goals that demonstrates the applicant's written communication skills. Documentation of a minimum of two years of full-time work and a resume should be attached as a supplement;
- Three letters of recommendation that attest to the applicant's readiness for graduate study and document the requisite minimum of two years of work experience;
- Official transcript(s) of all institutions attended;
- The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the
computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). The minimum acceptable composite score for the IELTS is 6.5.

- International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Graduate Record Examination (GRE) scores are not required.

**Degree Requirements**

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

Students pursuing the M.P.S. in HRER are required to complete a concentration designed to provide the student an opportunity to develop expertise in a specific area of human resources and employment relations.

Students will choose and complete one concentration which will include 6 credits beyond the 24 required course credits. Double counting 6 required credits, including the Research Project, the concentration will be 12 credits of course work in a particular area of HRER. Students will be required to complete the capstone project in their area of concentration. For example, students choosing the Benefits and Compensation concentration would be required to complete a capstone project that focused on some aspect of benefits and compensation. The program culminates with a research project which is completed through the capstone course, HRER 894.

Total Required Credits for the M.P.S.: 33 credits at the 400-400-level or higher; at least 18 credits must be at the 500- or 800-level, with at least 6 credits at the 500-500-level

**PREScribed Core Courses (12-27 credits)**

**HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER)**

501. Labor and Employment Law (3 credits)
504. Seminar in Industrial-Employment Relations (3 credits)
505. Seminar in Human Resources (3 credits)
800. International Context of HRER (3 credits)
802. Organizations in the Workplace (3 credits)
803. Human Resources in Multinational Enterprises (3 credits)
816. Labor Market Analysis (3 credits) or
825. Strategic Business Tools for HRER Professionals (3 credits)
836. Diversity in the Workplace (3 credits)
860. Ethical Decision Making for HR Practitioners (3 credits)
894. Research Topics (3 credits)
ELECTIVE Courses (96 credits)

Select 6 credits in area of concentration.

Select an additional 3 credit course from LER, HRER, or WF ED courses listed below.

AREAS OF CONCENTRATION (student must complete one)

--Benefits and Compensation

LER 424. Employment Compensation (3 credits)
LER 425. Employment Benefits (3 credits)

--Employment and Labor Law

LER 401. Law of Labor-Management Relations (3 credits)
HRER 811. Labor and Employment Law II (3 credits)

--Ethics and Leadership

LER 464. Communication Skills for Leaders in Groups and Organizations (3 credits)
LER 409. Leadership Development: A Life-Long Learning Perspective (3 credits)
or
LER 465. Collective Decision Making

--International Human Resources and Employment Relations

LER 403. International Human Resource Studies
HRER 801. Comparative and International Employment and Labor Law
(or
LER 400. Comparative Employment Relations Systems

--Labor and Collective Bargaining

LER 401. Law of Labor-Management Relations (3 credits)
LER 435. Labor Relations in the Public Sector (3 credits)

Labor Unions: Organization and Strategy

LER 466. Labor Union Structure, Administration, and Governance
LER 468. American Labor Unions

--Staffing, Training, and Development
LER 426 Staffing and Training Strategies in Organizations (3) or WF ED 471 Training in Industry and Business (3 credits)
WF ED 573 Needs Assessment for Industrial Trainers Workforce Development Professionals (3 credits)

**ELECTIVE COURSES: 9 credits**
Select 6 credits in area of concentration.
Select an additional 3 credit course from LER, HRER, or WF ED courses listed below.

**LABOR AND EMPLOYMENT RELATIONS (LER)**
401. Law of Labor-Management Relations (3 credits)
424. Employment Compensation (3 credits)
425. Employment Benefits (3 credits)
426. Staffing and Training (3 credits)
435. Labor Relations in the Public Sector (3 credits)
444. Occupational Health: Policy and Practices (3 credits)
445Y. Politics of Affirmative Action (3 credits)
460. Human Resources Ethics (3 credits)
464. Communication Skills for Leaders in Groups and Organizations (3 credits)
472. Work-Life Practices and Policies (3 credits)

**HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER)**
811. Labor and Employment Law II (3 credits)
816. Labor Market Analysis (3 credits)
825. Strategic Business Tools for HRER Professionals (3 credits)

**WORKFORCE EDUCATION AND DEVELOPMENT (WF ED)**
471. Training in Industry and Business (3 credits)
573. Needs Assessment for Industrial Trainers (3 credits)

**Integrated B.S. in Labor and Employment Relations and M.S. in Human Resources and Employment Relations**

The integrated LER B.S. and HRER M.S. is a five-year program designed for academically talented baccalaureate students to obtain both the B.S. and the M.S. degrees in LER and HRER with five years of study. Students will develop expertise in the human resources and labor relations fields beyond the B.S. degree. The undergraduate curriculum educates students about
(1) the roles of employers, employees, employee organizations, and public policy makers play in
the employment relationship, (2) the complex personal and organizational issues inherent in the
employment relationship (3) and how to systematically analyze those complex issues and
evaluate research relevant to those analyses. The graduate curriculum provides for more
individualized, focused learning in a concentrated sub-area of the HRER field. The program
culminates with an M.S. thesis or research paper. Upon completion of the integrated degree,
students will enter the workforce with advanced knowledge and expertise gained from
conducting and analyzing empirical work and participating in seminar-style classes.

Admission Requirements

Students must apply to and meet admission requirements of the Graduate School, as well as the
graduate program in which they intend to receive their master’s degree. Admission requirements
listed here are in addition to requirements stated in the GENERAL INFORMATION section of
the Graduate Bulletin.

The number of openings in the integrated B.S./M.S. program will be limited to undergraduates
with strong academic records. Applicants to the integrated program:

- must be enrolled in the LER B.S. program;

7. must complete the Penn State graduate degree application form and pay the application
fee;

- shall be admitted no earlier than the beginning of the third semester of undergraduate
study at Penn State (regardless of transfer of AP transfer or AP credits accumulated prior
to enrollment) and no later than the end of the second week of the semester preceding the
semester of expected conferral of the undergraduate degree, as specified in the proposed
IUG plan of study;

- should have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in the major;

- must obtain letters of recommendation from the chairs of the Department’s
undergraduate and graduate committees, and

- must submit a writing sample, 2 transcripts, 1 letter of recommendation (in addition to
those from the chairs of the Department’s undergraduate and graduate committees), and a
career statement.

In consultation with an adviser, students must prepare a plan of study appropriate to this
integrated program. Students must present their plan of study in person to the head of the
graduate program or the appropriate committee overseeing the integrated program prior to being
admitted to the program. The plan should cover the entire time period of the integrated program,
and it should be reviewed periodically with an adviser as the student advances through the
program.

No GRE or GMAT scores are required for admission to the program.
Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

M.S. REQUIREMENTS

+36* credits at the 400-level or higher, of which at least 20 must be earned at the established graduate campus/center of the University where the program is offered. At least 18 credits in the 500 and 600 series, combined, must be included in the program. A minimum of 12 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major program. If a student chooses to write a thesis, at least 6 credits in thesis research (600 or 610) must be included in the program. If the student chooses the research paper option, at least 18 credits must be in 500-level courses.

36 credits at the 400-level or higher; 18 credits must be at the 500 or 800 level, with at least 6 at the 500-level

*12 credits may be applied to both undergraduate and graduate degree program requirements double-counted. Students can choose which 12 credits will double-count for both the undergraduate and graduate degrees from the following list:

LER 401
LER 458Y
LER 460
HRER 501
HRER 502
HRER 504
HRER 505
HRER 516

At least 6 of the double-counted courses must be at the 500-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree. At least 6 must be at the 500 or 800 level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Students accepted into the program can receive their B.S. in Labor and Employment Relations if they are unable to complete the M.S. in HRER.

*The M.S. degree requirement for the 1-credit course HRER 510 is waived for students accepted into this IUG degree program, as HRER 510 is intended to familiarize new students with the field and the department; it is anticipated that these IUG students already will have this foundation.
PREScribed Core COURSES: Courses (21 credits)

HRER 501(3), HRER 502(3), HRER 504(3), HRER 505(3), HRER 512(3)**, HRER 513(3)**, HRER 516(3)
**or other statistics course approved in advance by graduate director
***or other methods course approved in advance by graduate director

Emphasis Courses (6 credits)

An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Students select an emphasis in consultation with their master's advisory committee.

Elective Courses (3-9 credits)

With the faculty adviser's approval, a student selects at least 3 or more elective credits, depending on the chosen option. A list of approved elective courses is maintained by the graduate program office.

Additional Courses: (15 credits)
Select 15 credits from the following list in consultation with adviser (a maximum of 6 credits may be at the 400 level).

Emphasis Courses (6 credits)
An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Select 6 credits from the M.S.-prescribed or additional courses in consultation with their adviser.

Thesis Option

The HRER thesis option is intended for students anticipating additional graduate education beyond the master's degree. It requires 37 credits, including a minimum of 30 at the 400-, and 500-, and 800-level, and a minimum of 6 600-level thesis credits. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations, as described above. A student's thesis should reflect the chosen emphasis. The thesis must be accepted by the student's advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.
Research Paper Option

The HRER research paper option is intended for students expecting to enter the labor market upon completion of the master’s degree. It requires a minimum of 37 credits at the 400-, and 500-, and 800-level. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations, as described above. A student’s research paper should reflect the chosen emphasis.

Integrated B.S. in Psychology and M.S. in Human Resources and Employment Relations

The integrated Psychology (PSYCHBS) B.S. and Human Resources and Employment Relations (HRER) M.S. is a five-year program designed for academically-talented undergraduate Psychology baccalaureate students to obtain both the B.S. degree in Psychology and the M.S. degree in HRER in an intense, accelerated program of study. Students will develop expertise in the human resources and employment relations field beyond that provided by their Psychology B.S. degree. The undergraduate psychology curriculum potentially introduces students to (1) personnel selection, (2) training and development, and (3) organizational psychology. The graduate curriculum provides for a more intensive, individualized, and focused examination of the human resources and employment relations field, including (1) the roles employers, employees, employee organizations, and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship, (3) the laws that form the legal framework for the employee-employer relationship, (4) the tools needed to systematically analyze those complex issues and evaluate research relevant to those analyses, and (5) human resource management policies and practices that contribute to individual and organizational success. It also provides an opportunity for students to explore a concentrated sub-area of the HRER field in depth. The program culminates with the student either completing a thesis or master’s paper. Upon completion of the integrated degree, students will be well-positioned to assume positions of greater responsibility in Industrial/Organizational Psychology, Human Resource Management, Employment Relations, and related careers as a result of the advanced knowledge and expertise gained through the program.

A minimum of 37 credits is needed to complete the M.S. degree in HRER. Twelve credits (400-level and above) can apply to both undergraduate and graduate degrees; six of these must be at the 500 or 800 level.

Admission Requirements

Students must apply to and meet admission requirements of the Graduate School, as well as the graduate program in which they intend to receive their master’s degree. Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.
Admission decisions for the B.S. Psychology/M.S. Human Resources and Employment Relations program are based on the quality of the applicant's credentials. The decisions are made after a review of the complete application portfolio. The integrated B.S./M.S. program will be limited to highly-talented undergraduates. Applicants to the integrated program:

- Must be enrolled in the PSYBSCH-B.S. program, pursuing the Business Option, with the successful completion of PSYCH 281, Introduction to Industrial-Organizational Psychology, AND one of the following: PSYCH 482, Selection and Assessment in Organizations, PSYSCH 484, Work Attitudes and Motivation, or PSYCH 485, Leadership in Work Settings;
- Must complete the Penn State graduate degree application and pay the application fee;
- Shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer of AP transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
- Must have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in the major;
- Must submit three letters of recommendation; and
- Must submit a writing sample, a resume, and a 2-3 page essay articulating career and educational goals that demonstrates the applicant’s written communication skills.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program. Students must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

No GRE or GMAT scores are required for admission to the program.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

M.S. Requirements

37 credits at the 400-level or higher, of which at least 20 must be earned at the established graduate campus/center of the University where the program is offered. At least 18 credits in the 500 and 600 series, combined, must be included in the program. A minimum of 12 credits in
course work (400, 500, and 800 series), as contrasted with research, must be completed in the major program. If a student chooses to write a thesis, at least 6 credits in thesis research (600 or 610) must be included in the program. If the student chooses the research paper option, at least 18 credits must be in 500-level courses.

12 credits may be applied to both undergraduate and graduate degree program requirements. Students can choose which 12 credits will double-count for both the undergraduate and graduate degrees from the following list:

LER 401
LER 460
HRER 500
HRER 501
HRER 502
HRER 503
HRER 504
HRER 505

At least 6 of the double-counted courses must be at the 500-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree; at least 6 must be at the 500- or 800-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double-counted towards any other degree.

Students accepted into the program can receive their B.S. in Psychology if they are unable to complete the M.S. in HRER.

Core Courses (22 credits)


*or other statistics course approved in advance by graduate director

Emphasis Courses (6 credits)

An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Students select an emphasis in consultation with their master's advisory committee.

Elective Courses (3-9 credits)

With the faculty adviser's approval, a student selects at least 3 or more elective credits, depending on the chosen option. A list of approved elective courses is maintained by the graduate program office.
**Thesis Option**

The HRER thesis option is intended for students anticipating additional graduate education beyond the master’s degree. It requires 37 credits, including a minimum of 30 at the 400- and 500-, and 800-level, and a minimum of 6 600-level thesis credits. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations, as described above. A student’s thesis should reflect the chosen emphasis. The thesis must be accepted by the student’s advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

**Research Paper Option**

The HRER research paper option is intended for students expecting to enter the labor market upon completion of the master’s degree. It requires a minimum of 37 credits at the 400--and, 500-, and 800-level. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations, as described above. A student’s research paper should reflect the chosen emphasis.

The M.S. requires 37 credits at the 400 level or higher: at least 18 credits must be at the 500 or 800 level, with at least 6 at the 500 level.

Twelve (12) of 37 credits can be double-counted for the B.S. and M.S. At least 6 of these must be at the 500 or 800 level.

**Prescribed Courses (22 credits)**

HRER 501(3), HRER 502(3), HRER 504(3), HRER 505(3), HRER 510(1),
HRER 512(3)**, HRER 513(3), HRER 516(3)

**or other statistics course approved in advance by Graduate Director**

**Additional Courses (9 credits)**

(Chosen in consultation with an advisor)
Choose any 500-level HRER course or 400 level LER course, HRER 600(3-6)

**Emphasis Courses (6 credits)**

An emphasis is an area of study related to a particular aspect or domain of human resources or employee relations. Select 6 credits of 400-level LER courses or 500-level HRER courses in consultation with an adviser.

**Master’s Research Paper or Master’s Thesis (6 credits)**

Students must complete either a Master’s Research Paper or a Master’s Thesis. Students choosing the Thesis option must complete 6 thesis credits (HRER 600). These credits can be counted towards the 15 credits required from the M.S. Additional Courses section above. The Thesis option is intended for students anticipating additional graduate education beyond the
Master's degree, Masters Research Paper or a Masters Thesis (6 credits)
Students must complete either a Masters Research Paper or a Masters Thesis. Students choosing the Thesis option must complete 6 thesis research credits (HRER 600). These credits can be counted towards the 15 credits required from the M.S. Additional Courses section above.

**HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER) course list**
**LABOR AND EMPLOYMENT RELATIONS (LER) course list**

**Integrated B.S. in Spanish and M.S. in Human Resources and Employment Relations**

The integrated Spanish B.S. and HRER M.S. is a five-year program designed for highly-qualified and motivated students seeking employment within a culturally diverse workplace. Students will develop basic skills in speaking, understanding, reading, and writing Spanish. Students will gain familiarity with Hispanic cultures through literature and the University's University's international education program, if they choose to have that experience. Students also will learn about (1) the roles that employers, employees, employing organizations, and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship, and (3) how to systematically analyze those complex issues and evaluate research relevant to those analyses.

For the B.S./M.S. degree in Integrated Spanish B.S. and Human Resources and Employment Relations M.S., a minimum of 154 credits is required. Twelve credits (400 level or above) can apply to both undergraduate and graduate degrees; at least 6 of these must be at the 500 level. Students can complete the B.S. in Spanish and not advance to the M.S. HRER degree if they desire.

**Admission Requirements**

Students must apply to and meet admission requirements of the Graduate School, as well as the graduate program in which they intend to receive their master’s degree. Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

The number of openings in the integrated B.S./M.S. program will be limited to undergraduates with strong academic records. Applicants to the integrated program:

- must be enrolled in the Spanish B.S. program;
- must complete the Penn State graduate degree application form, and pay the application fee;
- shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of
expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;

- should have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in the major;
- must obtain letters of recommendation from the chairs of the Department’s Spanish undergraduate committee and the HRER graduate committees; and
- must submit a writing sample, 2 transcripts, 1 letter of recommendation (in addition to those from the chairs of the Department’s undergraduate and graduate committees), and a career statement.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program. Students must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

No GRE or GMAT scores are required for admission to the program.

**Degree Requirements**

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

For the integrated Spanish B.S. and Human Resources and Employment Relations M.S., a minimum of 154 credits is required.

**M.S. Requirements**

37 credits at the 400-level or higher, of which at least 20 must be earned at the established graduate campus/center of the University where the program is offered. At least 18 credits in the 500 and 600 series, combined, must be included in the program. A minimum of 12 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major program. If a student chooses to write a thesis, at least 6 credits in thesis research (600 or 610) must be included in the program. If the student chooses the research paper option, at least 18 credits must be in 500-level courses.

12 credits may be applied to both undergraduate and graduate degree program requirements. Students can choose which 12 credits will double-count for both the undergraduate and graduate degrees from the following list:

LER 400
LER 458Y
LER 460
HRER 501
HRER 512
At least 6 of the double-counted courses must be at the 500-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree. at least 6 must be at the 500– or 800-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Students accepted into the program can receive their B.S. in Spanish if they are unable to complete the M.S. in HRER.

**M.S. REQUIREMENTS:** 37 credits at the 400 level or higher; 18 credits must be at the 500 or 800 level, with at least 6 at the 500 level

{12 credits may be double counted; at least 6 must be at the 500 level}

**PRESCRIBED Core COURSES (22 credits)**

HRER 501(3), HRER 502(3), HRER 504(3), HRER 505(3), HRER 510(1), HRER 512(3)*, HRER 513(3)**, HRER 516(3)

*or other statistics course approved in advance by graduate director
**or other methods course approved in advance by graduate director

**Emphasis Courses (6 credits)**

An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Students select an emphasis in consultation with their master's advisory committee.

**Elective Courses (3-9 credits)**

With the faculty adviser's approval, a student selects at least 3 or more elective credits, depending on the chosen option. A list of approved elective courses is maintained by the graduate program office.

**Thesis Option**

The HRER thesis option is intended for students anticipating additional graduate education beyond the master's degree. It requires 37 credits, including a minimum of 30 at the 400-, and 500-, and 800-level, and a minimum of 6 600-level thesis credits. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations, as described above. A student’s thesis should reflect the chosen emphasis. The thesis must be accepted by the student’s advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.
Research Paper Option

The HRER research paper option is intended for students expecting to enter the labor market upon completion of the master’s degree. It requires a minimum of 37 credits at the 400- and 500- and 800-level. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500- and 800-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations, as described above. A student’s research paper should reflect the chosen emphasis.

ADDITIONAL COURSES: (15 credits)
Select 15 credits from the following list in consultation with adviser (a maximum of 6 credits may be at the 400 level):

Emphasis Courses (6 credits)
An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Select 6 credits from the M.S. prescribed or additional courses in consultation with their adviser.

Master’s Research Paper or a Master’s Thesis (6 credits)
Students must complete either a Master’s Research Paper or a Master’s Thesis. Students choosing the Thesis option must complete 6 thesis research credits (HRER 600). These credits can be counted towards the 15 credits required from the M.S. Additional Courses section above.

HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER) course list
LABOR AND EMPLOYMENT RELATIONS (LER) course list
SPANISH (SPAN) course list

Integrated B.S. in LER-Labor and Employment Relations and M.P.S.
in Human Resources and Employment Relations

The integrated LER B.S. and HRER M.P.S is a five-year program designed for academically-talented World Campus baccalaureate students to obtain both the B.S. and the M.P.S. degrees in LER and HRER in an intense, accelerated program of study. Students will develop expertise in the human resources and employment relations field beyond the B.S. degree. The undergraduate curriculum introduces students to (1) the roles employers, employees, employee organizations, and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship (3) the laws that form the legal framework for the employee-employer relationship, and (4) the tools needed to systematically analyze those complex issues and evaluate research relevant to those analyses. The graduate curriculum provides for a more intensive, individualized, and focused examination of the human resources and employment relations field. It also provides an opportunity for students to explore a concentrated sub-area of the HRER field in depth. The program culminates with a research
A project which is completed through the capstone course, HRER 894. Upon completion of the integrated degree, students will have gained advanced knowledge and expertise from conducting and analyzing empirical work and participating in online classes that can be directly applied to the workplace.

A minimum of 33 credits as described below is needed to complete the MPS degree in HRER. Nine credits (400 level and above) can apply to both undergraduate and graduate degrees; six of these must be at the 500 or 800 level.

**Admission Requirements**

Students must apply to and meet admission requirements of the Graduate School, as well as the graduate program in which they intend to receive their master’s degree. Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. Admissions decisions for the B.S.-M.P.S. program are based on the quality of the applicant’s credentials. The decisions are made after a review of the complete application portfolio. The integrated B.S./M.P.S. program will be limited to highly-talented undergraduates. Applicants to the integrated program:

- must be enrolled in the LER B.S. program;
- must complete the Penn State graduate degree application and pay the application fee
- shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
- must have an overall GPA of 3.4 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.6 in the major;
- must submit 2 letters of recommendation from current or previous Penn State instructors and 1 additional letter of recommendation (should be professional or academic);
- must submit a writing sample, a resume, and 2-3 page essay articulating career and educational goals that demonstrates the applicant’s written communication skills;
- must present an approved plan of study (to be determined in consultation with the student’s undergraduate adviser and the Graduate Director, and to be signed by both; the approved Plan of Study should be reviewed periodically with an adviser as the student advances through the program); and
- must possess the equivalent of two years of full-time work experience prior to admission.

No GRE or GMAT scores are required for admission to the program.
**Degree Requirements**

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

Students pursuing the M.P.S. in HRER are required to complete a concentration designed to provide the student an opportunity to develop expertise in a specific area of human resources and employment relations.

Students will choose and complete one concentration which will include 6 credits beyond the 24 required course credits. Double counting 6 required credits, including the Research Project, the concentration will be 12 credits of course work in a particular area of HRER. Students will be required to complete the capstone project in their area of concentration. For example, students choosing the Benefits and Compensation concentration would be required to complete a capstone project that focused on some aspect of benefits and compensation. The program culminates with a research project which is completed through the capstone course, HRER 894.

Students accepted into the program can receive their B.S. in Labor and Employment Relations if they are unable to complete the M.S. in HRER.

Total Required Credits for the M.P.S.: 33 credits at the 400-level or higher; at least 18 credits must be at the 500- or 800-level, with at least 6 credits at the 500-level. 9 credits (400-level and above) can apply to both undergraduate and graduate degrees. Students can choose which 9 credits will double-count for both the undergraduate and graduate degrees from the following list:

LER 401
LER 458Y
LER 460
HRER 501
HRER 504
HRER 505
HRER 802
HRER 816

At least 6 of the double-counted courses must be at the 500- or 800-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree. At least 6 of these must be at the 500- or 800-level.

The program culminates with a research project which is completed through the capstone course, HRER 894. The M.P.S. requires 33 credits at the 400-level or higher; at least 18 credits must be at the 500 or 800-level, with at least 6 credits at the 500-level.

Nine (9) of 33 credits can be double counted for B.S. and M.P.S. At least 6 of these must be at the 500- or 800-level.
Prescribed Core Courses (24-27 credits)

HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER)

501. Labor and Employment Law (3 credits)
504. Seminar in Industrial-Employment Relations (3 credits)
505. Seminar in Human Resources (3 credits)
800. International Context of HRER (3 credits)
803. Human Resources in Multinational Enterprises
802. Organizations in the Workplace (3 credits)
803. Human Resources in Multinational Enterprises (3 credits)

816. Labor Market Analysis (3 credits)

or

825. Strategic Business Tools for HRER Professionals (3 credits)
836. Diversity in the Workplace (3 credits)
860. Ethical Decision Making for HR Practitioners (3 credits)
894. Research Projects-Topics (3 credits)

Elective Courses (6 credits)

Select 6 credits in area of concentration.

Areas of Concentration (student must complete one)

--Benefits and Compensation

LER 424. Employment Compensation (3 credits)
LER 425. Employment Benefits (3 credits)

--Employment and Labor Law

LER 401. Law of Labor-Management Relations (3 credits)
HRER 811. Labor and Employment Law II (3 credits)

--Ethics and Leadership

LER 464. Communication Skills for Leaders in Groups and Organizations (3 credits)
LER 409. Leadership Development: A Life-Long Learning Perspective (3 credits) or LER 465. Collective Decision Making

--International Human Resources and Employment Relations

LER 403. International Human Resource Studies
HRER 801. Comparative and International Employment and Labor Law or LER 400. Comparative Employment Relations Systems
--Labor and Collective Bargaining

LER 401. Law of Labor-Management Relations (3 credits)
LER 435. Labor Relations in the Public Sector (3 credits)

--Labor Unions: Organization and Strategy

LER 466. Labor Union Structure, Administration, and Governance
LER 468. American Labor Unions

--Staffing, Training, and Development

LER 426 Staffing and Training Strategies in Organizations (3) or WF ED 471 Training in Industry and Business (3 credits)
WF ED 573 Needs Assessment for Workforce Development Professionals (3 credits) Areas of Concentration (one required)

Benefits and Compensation

LER 424. Employment Compensation (3 credits)
LER 425. Employment Benefits (3 credits)

Employment and Labor Law

LER 401. Law of Labor-Management Relations (3 credits)
HRER 811. Labor and Employment Law II (3 credits)

Ethics and Leadership

LER/OLEAD 464. Communication Skills for Leaders in Groups and Organizations (3 credits)
OLEAD/LER 409. Leadership Development: A Life-Long Learning Perspective (3 credits) or
LER/OLEAD 465. Collective Decision Making

International-Human Resources and Employment Relations

LER 403. International Human Resource Studies

HRER 801. Comparative and International Employment and Labor Law or
LER 400. Comparative Employment Relations Systems
Labor and Collective Bargaining

LER 401. Law of Labor-Management Relations (3 credits)
LER 435. Labor Relations in the Public Sector (3 credits)

Labor Unions: Organization and Strategy

LER 466. Labor Union Structure, Administration, and Governance
LER 468. American Labor Unions

Staffing, Training, and Development

LER 426. Staffing and Training (3 credits) or WF-ED 471 Training in Industry and Business (3 credits)
WF-ED 573. Needs Assessment for Industrial Trainers (3 credits)

Elective Courses (9 credits)

Select 6 credits in area of concentration.
Select an additional 3-credit course from the following list of LER, HRER, and WF-ED courses:

Labor and Employee Relations (LER)

400. Comparative Employment Relations Systems (3 credits)
401. Law of Labor-Management Relations (3 credits)
403. International Human Resource Studies (3 credits)
424. Employment Compensation (3 credits)
425. Employment Benefits (3 credits)
426. Staffing and Training (3 credits)
435. Labor Relations in the Public Sector (3 credits)
444. Occupational Heath: Policy and Practice (3 credits)
445Y. Politics of Affirmative Action (3 credits)
460. Human Resource Ethics (3 credits)
464. Communication Skills for Leaders in Groups and Organizations (3 credits)

465. Collective Decision-Making (3 credits)

466. Labor Union Structure, Administration, and Governance (3 credits)

468. American Labor Unions

472. Work-Life Practices and Policies (3 credits)

**Organizational Leadership**

409. Leadership Development: A Life-Long Learning Perspective (3 credits)

**Human Resources and Employee Relations (HRER)**

801. Comparative and International Employment and Labor Law (3 credits)

811. Labor and Employment Law II (3 credits)

816. Labor Market Analysis (3 credits)

825. Strategic Business Tools for HRER Professionals (3 credits)

**Workforce Education and Development (WF-ED)**

471. Training in Industry and Business (3 credits)

573. Needs Assessment for Industrial Trainers (3 credits)

**Emphasis Courses (6 credits)**

An emphasis is an area of study related to a particular aspect or domain of human resources or employee relations. Select 6 credits of 400-level LRER courses or 500-level HRER courses in consultation with an adviser.

**Master's Research Paper or Master's Thesis (6 credits)**

Students must complete either a Master's Research Paper or a Master's Thesis. Students choosing the Thesis option must complete 6 thesis credits (HRER 600). These credits can be counted towards the 15 credits required from the M.S. Additional Courses section above. The Thesis option is intended for students anticipating additional graduate education beyond the master's degree.

**Student Aid**

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the STUDENT AID section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER) course list
CONSULTATION

The School of Labor and Employment Relations sent the program proposal to Avis Kunz, Assistant Dean for Online Education and Outreach, David Sylvia, Director of Academic Affairs for the World Campus, the Department of History, the Department of History, the Department of Management and Organization, the Department of Philosophy, the Department of Political Science, and Workforce Education and Development. Each consultant was sent the following message:

LER is proposing the creation of an Integrated B.S. in Psychology and M.S. in Human Resources and Employment Relations (offered through University Park), as well as, changes to the Masters in Professional Studies (MPS) program in Human Resources and Employment Relations (HRER). This will also impact the curriculum of the existing Integrated B.S. in LER and MPS in HRER (both offered via the World Campus).

Consultation with William H.A. Johnson, Associate Professor of Management, Penn State Behrend

From: "WILLIAM HAROLD JOHNSON" whi1@psu.edu
To: "Antone J Aboud" aja19@psu.edu
Sent: Sunday, June 28, 2015 4:05:42 PM
Subject: Re: Fwd: Consultation Request

Hi Antone,

Sorry I have read the proposed changes and see nothing wrong with the initiative. There were some typos I found but I am traveling now and have no access to my notes.

Good luck,

Bill

William H.A. Johnson, BSc., MBA, PhD
Associate Professor of Management
The Pennsylvania State University
Erie, The Behrend College
Sam and Irene Black School of Business

Consultation with Avis Kunz, Assistant Dean for Online Education and Outreach, Liberal Arts

From: "Avis Kunz" alm2@psu.edu
To: "Antone J Aboud" aja19@psu.edu
Sent: Tuesday, June 16, 2015 1:48:20 PM
Subject: Re: Consultation Request
Antone,

I am fine with this.

Avis

Consultation with David Sylvia, Director of Academic Affairs for Graduate Programs, The World Campus

From: "DAVID M SYLVIA" dms39@psu.edu
To: "Antone J Aboud" aja19@psu.edu
Cc: "Amanda Mulfinger" arm10@psu.edu
Sent: Monday, June 8, 2015 3:57:10 PM
Subject: RE: Consultation Request

Thank you for sharing with me the proposed changes to your HRER degrees. I concur with the proposed changes to the World Campus delivered MPS in HRER, specially:

- making HRER 860 a required course,
- renaming HRER 800 to HRER 803 and revising according, and
- adding concentrations in International Human Resources and Employment Relations, Ethics and Leadership, and Labor Union Organization and Strategy.

Best regards,

David

*****************************************************************************

David M. Sylvia, Professor
Director of Academic Affairs for Graduate Programs
Penn State Online, The World Campus
222G Outreach Building
University Park, PA 16802-7012
Office: 814-863-6726, Fax: 814-863-7042
e-mail: dmsylvia@psu.edu

Consultation with the Department of History – Michael Kulikowski, Head

From: Michael Kulikowski [mailto:mek31@psu.edu]
Sent: Monday, June 29, 2015 9:02 AM
To: Antone J Aboud aja19@psu.edu
Cc: Everhart pxm205@psu.edu
Subject: Re: Consultation Request

Hi Antone,
I thought this had been dealt with. Sorry. We have no concerns.

Best,

Michael

Michael Kulikowski
Professor of History and Classics
Head, Department of History
108 Weaver Bldg, Penn State
University Park, PA 16802
814-865-1367
mek31@psu.edu

Consultation with the Department of Management and Organization – Dennis Gioia, Department Chair

From: Denny Gioia [mailto:dag4@psu.edu]
Sent: Tuesday, June 30, 2015 12:43 PM
To: Antone J Aboud aja19@psu.edu
Cc: Brian Cameron <bcameron@smeal.psu.edu>; Lisa O'Hara <ljoh109@psu.edu>; Everhart <pxm205@psu.edu>

Subject: RE: Consultation Request

Antone

I have had a chance to look over the docs you sent. I recognize that you want to get moving on these proposals, but I think they are tied up with larger issues involving LER’s and Smeal’s mutual interests in the online domain – especially the proposals concerning the 800-level courses. Therefore, I think the issues around these proposals should be bundled into a more general discussion that we would like to have with you, Paul Clark, et al. sometime this summer. I’m confident we can work out some agreements, but at the moment the issues are not resolved.

Denny

Date: July 29, 2015,
To: Graduate Council Subcommittee on New and Revised Programs and Courses
From: Paul F. Clark, Director, School of Labor and Employment Relations
Subject: Response to Consultation re PSYCH/HRER IUG and MPS in HRER
The School of Labor and Employment Relations (LER) is presenting two proposals: an Integrated B.S. in Psychology and M.S. in Human Resources and Employment Relations (offered through University Park); and, changes to the Masters in Professional Studies (MPS) program in Human Resources and Employment Relations (HRER). The MPS changes include the establishment of three new concentrations involving existing courses.

On June 8, 2015 as part of the curricula process we requested consultation with ten academic administrators and programs. All of those programs support our proposal with the exception of the Department of Management and Organizations (M&O) in the Smeal College of Business. The Chair of that program submitted the following comments:

“I have had a chance to look over the docs you sent. I recognize that you want to get moving on these proposals, but I think they are tied up with larger issues involving LER’s and Smeal’s mutual interests in the online domain—especially the proposals concerning the 800-level courses. Therefore, I think the issues around these proposals should be bundled into a more general discussion that we would like to have with you, Paul Clark, et al. sometime this summer. I’m confident we can work out some agreements, but at the moment the issues are not resolved.”

These are simple, straightforward proposals. There is no overlap between them and any program or course currently offered by Smeal. The School of LER asks that the proposal go forward and be approved as the objection raised by the Dept. of Management & Organization is not relevant to either proposal.

The Integrated B.S. in Psychology and M.S. in Human Resources and Employment Relations is a residential-only program that would not involve students or policy considerations related to any existing need for discussion with Smeal concerning its interest in the “online domain”.

With respect to the 800-level courses to which the objection refers, these are all courses that are already in existence. The courses have all been approved by the Graduate School after appropriate review. In the most recent case, changes in the course number (HRER 800 to 803), title and description were approved by the Graduate School after the Chair of Smeal’s Department of Management & Organization had been consulted. The identification of three new areas of concentration that will allow our MPS students to leverage their education in the job market again does not require any change to the existing 800 level course offerings.

We are continuing to engage in discussions about the Dept. of Management & Organization’s plans to offer a certificate and courses in the HR area, but the consultation process is not the vehicle for resolving differences on these broader strategic issues. Ultimately, delaying unrelated programmatic changes such as these will only have an adverse impact on our students, and in the case of the IUG changes, on Dept. of Psychology majors.
Consultation with the Department of Philosophy – John Christman, Professor

From: "John Philip Christman" jpe11@psu.edu
To: "Antone J Aboud" aja19@psu.edu
Sent: Monday, June 8, 2015 7:05:55 PM
Subject: Re: Consultation Request

Dear Antone,

Thanks for consulting with us. I looked over the proposals briefly and can study them in more detail, but I can't really see anything that we would have a comment on. I see that you list Phil among departments that might be the source of supporting courses, but is there some other aspect of the program that should get my attention?

If, on the other hand, you were merely making sure you went through all the consulting requirements and wanted to include us, then consider us consulted, and I wish you luck with the program.

All best,

John

Consultation with the Department of Psychology – Richard Carlson, Associate Head

From: RICHARD ALAN CARLSON [mailto:cvy@psu.edu]
Sent: Friday, September 25, 2015 9:11 AM
To: PATRICIA ANN EVERHART pxm205@psu.edu
Subject: RE: consultation for Psych/HRER IUG

Hi, Trisha – Yes, Psychology supports this proposal. Do you need me to enter something in curriculum.psu.edu?

Rich

Rich Carlson, Professor and Associate Head, Psychology
Department of Psychology, Penn State University
445 Moore Building, University Park, PA 16802-3106
Office 814-863-1736 Fax 814-863-7002 racarlson@psu.edu

Consultation with the Department of Political Science – Lee Ann Banaszak, Head

From: "LEE ANN BANASZAK" lab14@psu.edu
To: "Antone J Aboud" aja19@psu.edu
Sent: Monday, June 29, 2015 5:22:20 PM  
Subject: Re: Consultation Request

Dear Antone,

I've taken a look at both proposals, and am happy to endorse both changes. I am heading off on vacation but will be returning on July 7th.

Please let me know if you need any additional action on my part.

Sincerely,

Lee Ann Banaszak  
Professor and Head  
Department of Political Science  
E-mail: lab14@psu.edu  
Tel.: 814/865-6573

Consultation with Workforce Education – William Rothwell, Professor

From: William J. Rothwell [mailto:wjr9@psu.edu]  
Sent: Tuesday, June 30, 2015 5:21 PM  
To: Antone J Aboud aja19@psu.edu  
Cc: Wesley Donahue wed105@psu.edu  
Subject: Re: Consultation Request

Aboud:

I have reviewed the proposals and am happy to endorse the changes.

Bill R.
APPENDIX A: PROGRAM CHECKLIST

INTEGRATED B.S. IN PSYCH (PSYCHOLOGY)
AND
M.S. IN HRER (HUMAN RESOURCES AND EMPLOYMENT RELATIONS)

Major Requirements: 74-77 credits
(This includes 9 credits of General Education courses: 3 credits of GWS courses and 6 credits of GQ courses.)

A. PRESCRIBED COURSES: (16 CREDITS)
   PSYCH 100 (3) ___   PSYCH 105 (3) ___   ENGL 202A (3) ___
   PSYCH 30W (4) ___   PSYCH 490 (3) ___

B. ADDITIONAL COURSES: (34 CREDITS)

   Select 6 credits of GQ courses
   
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<tr>
<th>Course</th>
<th>Semester</th>
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Choose one:
   PSYCH 200GQ (4) ___ or STAT 200GQ (4) ___

Select 12 credits of 200-level PSYCH courses (not to include PSYCH 294, PSYCH 296, or PSYCH 297).
At least 3 credits must be from each group 1, 2, and 3:
   1. PSYCH 253 GS(3) ___ PSYCH 256 GS(3) ___ PSYCH 260(3) ___
      PSYCH 261 GS(3) ___
   2. PSYCH 212 GS(3) ___ PSYCH 221 GS(3) ___ PSYCH 231 GS-US(3) ___
      PSYCH 238 GS(3) ___
   3. PSYCH 243 GS(3) ___ PSYCH 269(3) ___ PSYCH 270(3) ___
      PSYCH 281 GS(3) ___

   4. Any 200-level Psych course

Select 12 credits of PSYCH courses at the 400 level (not including PSYCH 490, and including no more than 3 credits of PSYCH 493, PSYCH 494, PSYCH 495, or PSYCH 496)

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<th>Course</th>
<th>Semester</th>
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C. REQUIREMENTS FOR THE BUSINESS OPTION: (24 credits)

ADDITIONAL COURSES (15 credits)
Select 15 credits from at least two different groups, **12 of these credits will fall under group 2, section c (Labor Relations) and will double count for both the undergraduate and graduate degrees, at least 6 credits must be at the 500 level.** Three (3) credits in any category can be replaced by internship (L A 495), but internship credits alone cannot be used to complete a category.

1. a. ECON 102 GS(3), ECON 104 GS(3), ECON 014 GS(3), ECON 302 GS(3) or higher-numbered ECON course; PHIL 420(3), PL SC 412(3), PL SC 444(3), PL SC 481(3), PL SC 490(3)
   b. BA 301(3), FIN 301(3) or any higher-numbered FIN course
   c. BA 303(3), MKTG 301(3) or any higher-numbered MKTG course
   d. ACCTG 211(4)

2. a. Management:
   H P A 101(3), H P A 301(3) or any higher-numbered H P A course, BA 304(3), MGMT 301(3) or any higher-numbered MGMT course
   b. Law and ethics:
   c. Labor relations: 12 of these credits will double-count
   d. Communication:
   CAS 352(3), CAS 450W(3), CAS 452(3), ENGL 419(3), LER 464(3)

3. a. Global view:
   b. Gender and race:
   c. History:
   HIST 423 IL(3), HIST 425 IL(3), HIST/LER 458Y US(3)

SUPPORTING COURSES AND RELATED AREAS (9 credits)
Select 3 credits in arts/humanities from department list
Select 3 credits in natural sciences from department list
Select 3 credits in social and behavioral sciences from department list

D. M.S. REQUIREMENTS: 37 credits at the 400-level or higher, of which at least 20 must be earned at the graduate campus where the program is offered. At least 18 credits in the 500 and 600 series. A minimum of 12 credits in course work (400, 500, and 800 series). 12 of 37 credits can be double counted for the B.S. and M.S.; at least 6 of these credits must be at the 500-level.
PRESCRIBED COURSES: (22 credits)

HRER 501(3)  HRER 502(3)  HRER 504(3)  HRER 505(3)
HRER 510(1)  HRER 512(3)  HRER 513(3)  HRER 516(3)

ADDITIONAL COURSES (9 credits):
(Chosen in consultation with an adviser)

HRER 500(3)  HRER 503(3)  HRER 523(3)  HRER 536(3)
HRER 594(3)  HRER 595(3)  HRER 596(3)  LER 400(3)
LER 401(3)   LER 403(3)   LER 424 (3)  LER 425 (3)
LER 426 (3)  LER 434 (3)  LER 435 (3)  LER 437 (3)
LER 444 (3)  LER 458Y (3)  LER 460 (3)  LER 464 (3)
LER 465 (3)  LER 472 (3)  LER 475H (3)  LER 480 (3)

RESEARCH PAPER or THESIS OPTION: (6 credits)

Research Paper

Complete 6 additional credits of LER 4XX or HRER 5XX

LER 4XX / HRER 5XX _____ (3)

OR

Thesis Option

Complete 6 additional credits of HRER 600 _____ (6)

Scheduling Recommendation

Semester Standing 5-6
Students should complete at least two courses (6 credits) within the Business Option, group 2, section C (Labor Relations) - these credits will be double counted

Semester Standing 7-8
Students complete two graduate classes (6 credits, recommend 3 credits be HRER 504 or HRER 505); students complete HRER 510 (1 credit seminar); an internship is recommended at some time between semesters 6 and 9.

Semester standing 9-10

Students who have chosen to complete the research paper:

- Students complete 12 graduate credits each semester; research paper

Students who have chosen to complete a thesis:

- Students complete 12 graduate credits each semester (to include 6 credits of HRER 600); thesis
APPENDIX B: PLAN OF STUDY

*Integrated Undergraduate/Graduate Degree Program:  
B.S. in PSYCH and M.S. in HRER*

Name: ___________________________  PSU ID: __ / __ / __ / __ / __
Undergraduate Major: ___________________________  Date Baccalaureate Diploma: ________________

Graduate Program: ___________________________  Date Graduate Diploma: ________________

Identify courses still to be taken for your undergraduate major(s) and courses required for completion of the graduate program that you plan to take before earning in your baccalaureate diploma:

| Courses Needed for your | Courses needed for your | Courses needed for Both |
| Undergraduate Transcript Only | Graduate Transcript Only | Transcripts |
| Course | Semester | Credits | Course | Semester | Credits | Course* | Semester | Credits |
|_______|_______|_______|_______|_______|_______|_______|_______|_______|
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|_______|_______|_______|_______|_______|_______|_______|_______|_______|

Total ________  Total ________  Total** ________

Important Notes:
* A minimum of 6 credits proposed to double-count must be at the 500 or 800 level.
** No more than 12 credits may double count.

If you plan to earn your baccalaureate degree before your graduate degree, identify courses required for completion of the graduate program (if any) that you plan to take after earning your baccalaureate diploma. Any courses that you plan to double-count or transfer to your graduate transcript must be processed prior to your baccalaureate degree conformation. Once your baccalaureate degree is conferred, you will no longer be eligible to be enrolled as an IUG student.

Course Semester Credits
_______  ______
_______  ______
_______  ______
_______  ______
Total  ______

(Complete the reverse side)
Identify all courses required for completion of your **General Education and University Requirements**. For each course **yet to be taken**, please indicate what semester you intend to take it.

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<th>Semester</th>
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<td>Composition, Writing, and Speech Communication (GWS)</td>
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<td>Arts (GA)</td>
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<td>Quantification (GQ)</td>
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<td>Humanities (GH)</td>
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<tr>
<td>Social &amp; Behavioral Sciences (GS)</td>
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<td>Natural Sciences (GN)</td>
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<td>Health &amp; Physical Activity (GHA)</td>
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<td>International &amp; Intercultural Competence (GI, US or IL)</td>
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<td>Writing Across the Curriculum (W)</td>
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Student

(Signature) (Date)

Graduate Director

(Signature) (Date)

Undergraduate Adviser

(Signature) (Date)
APPENDIX C: STUDENT HANDBOOK

Integrated Undergraduate-Graduate (IUG) Degree Student

Bachelor of Science in Psychology
Master of Science in Human Resources and Employment Relations

Handbook

Introduction..................................................................................................................2
Admission Requirements.............................................................................................2
   Eligibility for a Graduate Assistantship ..................................................................3
Degree Requirements for the M.S. Degree .................................................................3
   About the Emphasis..................................................................................................4
   Thesis Option .........................................................................................................4
   Reduced Course Load ............................................................................................ Error! Bookmark not defined.
   Scholarship and Research Integrity (SARI).............................................................6
Advising .......................................................................................................................6
Students in Good Standing..........................................................................................6
Academic Integrity.......................................................................................................7
Introduction

This Handbook formally specifies the requirements and procedures governing the faculty and students in the Bachelor of Science in Psychology and Master of Science in Human Resources and Employment Relations Integrated Undergraduate Graduate Program (IUG) Program. This is a five-year program designed for academically-talented undergraduate Psychology baccalaureate students to obtain both the B.S. degree in Psychology and the M.S. degree in HRER in an intense, accelerated program of study. Students will develop expertise in the human resources and employment relations field beyond that provided by their Psychology B.S. degree.

Admission Requirements

Students must apply to and meet admission requirements of the Graduate School, as well as the graduate program in which they intend to receive their master’s degree. Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Admission decisions for the B.S. Psychology /M.S. Human Resources and Employment Relations program are based on the quality of the applicant’s credentials. The decisions are made after a review of the complete application portfolio. The integrated B.S./M.S. program will be limited to highly-talented undergraduates. Applicants to the integrated program:

- Must be enrolled in the PSYBS program, pursuing the Business Option, with the successful completion of PSYCH 281, Introduction to Industrial-Organizational Psychology, AND one of the following: PSYCH 482, Selection and Assessment in Organizations, PSYCH 484, Work Attitudes and Motivation, or PSYCH 485, Leadership in Work Settings;
- Shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
- Must have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in the major;
- Must submit three letters of recommendation; and
- Must submit a writing sample, a resume, and a 2-3 page essay articulating career and educational goals that demonstrates the applicant’s written communication skills.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program. Students must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program,
and it should be reviewed periodically with an adviser as the student advances through the program.

No GRE or GMAT scores are required for admission to the program.

**Eligibility for a Graduate Assistantship**

Students in the IUG program will be eligible for consideration for a graduate assistantship to be awarded beginning the fifth year. Graduate students appointed to half-time (twenty hours per week) assistantships are paid according to their classification level. A higher level means a higher salary. Most master's students are level 11. The stipends for those working fewer than twenty hours are prorated accordingly. All recipients are expected to remain in “good standing” (see below). Assistantships are awarded on a competitive basis to students at the discretion of the School.

**Degree Requirements for the M.S. Degree**

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

**M.S. Requirements**

37 credits at the 400-level or higher, of which at least 20 must be earned at the established graduate campus/center of the University where the program is offered. At least 18 credits in the 500 and 600 series, combined, must be included in the program. A minimum of 12 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major program. If a student chooses to write a thesis, at least 6 credits in thesis research (600 or 610) must be included in the program. If the student chooses the research paper option, at least 18 credits must be in 500-level courses.

12 credits may be applied to both undergraduate and graduate degree program requirements; at least 6 must be at the 500- or 800-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Students accepted into the program can receive their B.S. in Psychology if they are unable to complete the M.S. in HRER.

**Core Courses (22 credits)**


*or other statistics course approved in advance by graduate director
Emphasis Courses (6 credits)

An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Students select an emphasis in consultation with their master’s advisory committee.

Elective Courses (3-9 credits)

With the faculty adviser’s approval, a student selects at least 3 or more elective credits, depending on the chosen option. A list of approved elective courses is maintained by the graduate program office.

Thesis Option

The HRER thesis option is intended for students anticipating additional graduate education beyond the master’s degree. It requires 37 credits, including a minimum of 30 at the 400-, 500-, and 800-level, and a minimum of 6 600-level thesis credits. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations, as described above. A student’s thesis should reflect the chosen emphasis. The thesis must be accepted by the student’s advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Research Paper Option

The HRER research paper option is intended for students expecting to enter the labor market upon completion of the master’s degree. It requires a minimum of 37 credits at the 400-, 500-, and 800-level. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations, as described above. A student’s research paper should reflect the chosen emphasis.

About the Emphasis

An emphasis is an area of study related to a particular aspect or domain of Human Resources and Employment Relations. An emphasis is designed to broaden and deepen a student’s instructional experience within the School. Students select an emphasis in consultation with their advisory committee. Recognizing that the School cannot satisfy all students’ learning objectives, the Graduate Director may give a student permission to take courses in other academic departments to satisfy his or her emphasis. However, courses taken outside the School for an emphasis cannot substitute for HRER required credits. No course should be taken outside the School without first securing approval from the Graduate Director.

Proposals

Proposals are written in consultation with a permanent adviser. Proposals are reviewed and approved by advisory committees at formal meetings.
At least seven calendar days prior to a scheduled meeting of a committee, a written proposal must be made available to the entire School and a written notice of the meeting given to all faculty and graduate students. Primary responsibility for the notice resides with the adviser, but students share the responsibility.

The meeting must be held during regularly scheduled class days or examination days at the University. Once a proposal is successfully defended, it constitutes a binding agreement between the student and the committee (see Form 6 - Thesis Proposal Approval). If the research will involve primary data collection from people, the student must obtain approval through the Office of Research Protections. (ORP forms webpage.)

**Objectives**

The master’s thesis is intended to be a relatively limited research exercise, focused on a manageable empirical topic within a student’s chosen emphasis. It does not have to involve some completely new contribution to knowledge. It can be a replication of an earlier investigation or an attempt to extend an established hypothesis. Nonetheless, the thesis should be focused on a well-defined topic, restricted in scope, and carried out with care and rigor. A thesis following these guidelines could easily be achieved within fifty pages.

**Final Defense**

A student’s adviser and committee shall arrange a suitable time and place for the thesis defense. It must be held during regularly scheduled class days or examination days at the University. The adviser will circulate a memorandum to all School faculty members and graduate students at least seven calendar days in advance, inviting them to attend the defense and notifying them that the thesis is available for their perusal. Students share the responsibility for the notification of the School.

A formal thesis defense includes: a ten to fifteen-minute overview of the research project by the student, followed by questions from the advisory committee and other attendees. Upon completion of the question and answer session, only the committee will remain in the room to deliberate.

A thesis defense will focus on the thesis and on other topics as deemed appropriate by the committee. No more than one dissenting vote from the candidate’s committee can be registered for a successful defense. Upon completion of the defense, Form 2 – Thesis Defense Approval must be signed by the committee and forwarded to the Graduate Staff Assistant.

While a student may successfully pass this defense, he or she normally will be requested to revise the thesis before it is submitted to the Graduate School with faculty signatures.

**Distribution of Copies**

A student must submit their thesis in electronic format (PDF FILE ONLY) to the Graduate School.

IMPORTANT – Consult the Thesis and Dissertation Information for more information.
Scholarship and Research Integrity (SARI)

All entering Psychology IUG students will be expected to complete the online Scholarship and Research Integrity training by no later than October 1 of their first semester in residence if they begin their Program in the Fall. Students beginning in the Spring semester will need to complete the training by Feb. 15.

It is the responsibility of the student to go to the SARI website at http://www.citiprogram.org/ and follow directions below:

To access the CITI courses:
Select “Pennsylvania State University” as the participating institution, and complete the rest of the enrollment information. On the “Curriculum Selection” page, choose the CITI course that is required for your SARI program. Once you have registered, you may enter and leave the course at any time, completing modules as time permits.

In addition, the required 5-hour discussion-based component will be completed in HRER 513, Research Methods in Human Resources and Employment Relations, which is a prescribed course in the M.S. curriculum.

Advising

Upon acceptance to the IUG program, the student will be assigned a graduate adviser from the School of Labor and Employment Relations who will work in conjunction with their established Psychology undergraduate adviser. Along with both advisers, the student will plan the remainder of his/her undergraduate studies to complement the proposed graduate plan of study; semester reports must be submitted to Graduate Enrollment Services in a timely fashion (each semester). Students will be advised to first fulfill basic undergraduate requirements so that they can complete the undergraduate degree if, for some reason, they are not able to complete the graduate program.

Students in Good Standing

Students are expected to take the courses and examinations necessary to satisfy the requirements of the Graduate School and the School according to the rules specified in the Graduate Degree Programs Bulletin. Specifically, “good standing” refers to the satisfactory completion of courses taken, avoidance of accumulating incompletes, scheduling of required courses, fulfillment of all School and Graduate School requirements in their proper sequence, and development toward assuming a professional role.

Each student is expected to maintain a cumulative GPA of at least 3.0 on all work taken, including any prerequisite or supporting courses. Students are allowed only one “C” on their transcript, regardless of their grade-point average. The University uses an A through F system in assigning grades. The grade of “DF” (Incomplete) may be given when, because of extenuating circumstances, course requirements have not been completed. Students must apply for a DF.
However, obtaining a “DF” should be avoided except in the direst circumstances and must be removed during the first ten weeks of the subsequent semester in order to prevent the grade from converting to an “F.”

In addition to the successful completion of academic work, students should endeavor to maintain the highest academic and professional standards of the School, University, and the profession to which they aspire. If a student conducts him or herself in a manner unbefitting a member of the academic discipline, such conduct may be reviewed at a meeting of the School Graduate Committee convened for that purpose. The Graduate Committee’s recommendations will be made known to the School Director who will decide what further action, if any, should be taken. Disciplinary actions will be in keeping with University policies.

The School’s Director of Graduate Studies will evaluate the progress of each active student every year.

Students must complete all degree requirements, including thesis defense within eight years of admission to degree status.

**Academic Integrity**

Students are expected to be aware of what constitutes academic dishonesty and to uphold the highest standards of academic integrity at all times. Instructors have the option of reporting any acts of academic dishonesty to the School’s Graduate Director, as well as to the College of the Liberal Arts Academic Integrity Program. Acts of academic dishonesty (as defined in the University’s policy on academic integrity, including cheating on exams, plagiarism, or collaboration on written assignments) can result in failure of the course and can subject students to dismissal from the HRER Graduate Program. More information on Penn State’s Academic Integrity Policy can be found by visiting: [http://www.psu.edu/dept/ufs/policies/47-00.html#49-20](http://www.psu.edu/dept/ufs/policies/47-00.html#49-20). Additional information related to Penn State’s Code of Conduct may be found by visiting the Graduate Degree Programs Bulletin Appendices at: [http://bulletins.psu.edu/graduate/appendices/](http://bulletins.psu.edu/graduate/appendices/).
Graduate Council
Program, Option, or Minor Proposal Form

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Curriculum Coordinator, University Faculty Senate, 101 Kern Graduate Building, University Park. The proposals will be transmitted to the Office of the Dean of the Graduate School for entry into the Graduate Council curricular review process; for more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

College/School: College of Information Sciences and Technology
Department or Instructional Area: Information Sciences and Technology

New Graduate Program, Option, or Minor: ☑ Add

Designation of new graduate program: Integrated Bachelor of Science in IST and Master of Science Degree in IST

Classification of Instructional Programs (CIP) Code: 11.0103

Designation of new graduate option:

Designation of new graduate minor:

Indicate effective semester:
☑ First semester following approval
☐ Second semester following approval

Existing Graduate Program Option, or Minor: ☐ Change ☐ Drop

Current designation of graduate program:

Current designation of graduate option:

Current designation of graduate minor:

New designation of existing graduate program (if changing):

New designation of existing graduate option (if changing):

New designation of existing graduate minor (if changing):

Brief description of the change (if not noted above):

Indicate effective semester:
☐ First semester following approval
☐ Second semester following approval

Submitted by Graduate Program Head
Dr. Mary Beth Rosson, Assoc. Dean
Printed name
Signature
Date: 8/1/15

Noted by College/School Representative to Graduate Council Subcommittee on New and Revised Programs and Courses:
Dr. Dinghao Wu, Asst. Professor
Printed name
Signature
Date: 8/2/15

Approved by College/School Dean/Chancellor (or Designee):
Dr. Andrew Sears, Dean
Printed name
Signature
Date: 9/1/15
<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair, Graduate Council Subcommittee on New and Revised Programs</td>
<td>Luis Ayala</td>
<td>VoltFritT</td>
<td>10/14/2015</td>
</tr>
<tr>
<td>and Courses:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chair, Graduate Council Committee on Programs and Courses:</td>
<td>Andris Freivalds</td>
<td>VoltFritT</td>
<td>10/14/2015</td>
</tr>
<tr>
<td>and Courses:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dean of the Graduate School:</td>
<td>Regina Vasilatos-Younken</td>
<td>VoltFritT</td>
<td>10/14/2015</td>
</tr>
</tbody>
</table>
Program Change Proposal to create an Integrated Undergraduate – Graduate (IUG) Degree Program combining the B.S. in Information Sciences and Technology with the M.S. in Information Sciences and Technology

Graduate Program in Information Sciences and Technology

College of Information Sciences and Technology

Penn State-University Park

July 2015
Information Sciences and Technology
Integrated Undergraduate-Graduate (IUG) Degree Program Proposal
(M.S. with B.S. in Information Sciences and Technology)

Executive Summary

A. Objective of the Proposed IUG Program

The objectives of the Integrated Undergraduate Graduate Program in Information Sciences and Technology include:

1. To offer highly qualified students the opportunity to earn two degrees in less time than it would take to do two sequential degrees. In particular, IUG students may count up to 12 credits towards both their B.S. and M.S. degree requirements.
2. To permit coherent planning of studies through the graduate degree, with advising informed by not only the requirements of the baccalaureate program, but also the longer-range goals of the graduate degree.
3. To introduce undergraduate students to the rigors of both graduate study and graduate faculty.
4. To make the resources of the Graduate School available to IUG students.
5. To allow students with IUG status to benefit from their association with graduate students whose level of work and whose intensity of interest and commitment parallel their own.
# Table of Contents

**IUG Degree Program Proposal**

1. Introduction ............................................................................................................................................. 1

2. Application Process .................................................................................................................................. 1

3. IUG Degree Requirements ..................................................................................................................... 3

   Appendix A. Recommended schedule for Information Sciences and Technology Program ................................................................. 3

   Appendix B. Recommended schedule for Information Sciences and Technology IUG Students ................................................................. 4

   Appendix C. External Consultation .............................................................................................................. 5

   Appendix D. University Graduate Bulletin .................................................................................................... 9

   Appendix E. Masters of Science Handbook to include IUG ...................................................................... 19
I. INTRODUCTION

The integrated B.S./M.S. (IUG) degree in Information Sciences and Technology meets the needs of the most academically talented students in the Information Sciences & Technology undergraduate major. A proportion of these successful students wish to pursue graduate studies sometime after graduation. Offering the IUG benefits these students by offering an accelerated path to a graduate degree. Additionally, the IUG program can provide these students with a more cohesive program of study with opportunities to engage in more comprehensive research leading to both the Bachelor’s and Master’s degree.

While we have allowed honors students to complete an IUG through the Schreyer Honors College IUG program, we seek to formalize an IUG program in the College of IST for all students. The College of IST has a good number of undergraduate students—honors and non-honors qualified—involved in research (approximately 10% according to a recent informal survey of faculty); and there has been steady interest in an IUG offering for non-honors undergraduate students. The IUG program will allow us to recruit excellent students into our undergraduate program and will offer these students a head start on graduate education.

II. APPLICATION PROCESS

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Information Sciences and Technology Form, a transcript, and two letters of recommendation (both from faculty members) to the IST Graduate Programs Office. The Director of Undergraduate Academic Affairs, in consultation with the Graduate Programs Coordinator, will help undergraduate candidates determine a proposed sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. Acceptance into the IST IUG program will be determined by the Graduate Recruitment Committee.

Information Sciences and Technology undergraduates may apply for admission as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in a College of IST undergraduate degree program.
2. Must have completed 60 credits of an IST undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must apply to and be accepted without reservation into The Graduate School and M.S. program in IST. Students must complete the Graduate School application.
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study.
7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students should follow guidelines and procedures for applying for IUG in the Schreyer Honors College:

http://www.shc.psu.edu/students/iug/program/

In addition, applicants must apply to and be admitted to the Graduate School of the Pennsylvania State University at the time of their application to the IUG degree program.

These admission standards are high, as it is thought the program will only be appropriate for students with high levels of academic skills. The program area does have discretion in admitting Information Sciences and Technology majors into the integrated program, and extenuating circumstances can always be considered in terms of possible admission. Individuals who are unable to be admitted in to the integrated program of study can apply for regular admission to the graduate program when they complete their undergraduate program of study.

Upon acceptance into the program, the student will be assigned a graduate adviser who is a graduate faculty member. In addition, the student will plan the remainder of his or her undergraduate program of studies to complement the proposed plan of study.

**Eligibility for a Graduate Assistantship**

Students in the IUG program will be eligible for consideration for a graduate assistantship to be awarded once admitted to the IUG program.

**III. IUG DEGREE REQUIREMENTS**

The IUG program in Information Sciences an Technology is intended to provide accelerated graduate study in information sciences and technology for promising undergraduate students, while emphasizing the development of advanced core information science knowledge and research skills. The IUG program is intended to prepare individuals for research-oriented careers in fields such as health, education, and government. Some graduates of the master’s degree program in Information Sciences and Technology may opt to pursue doctoral studies.

Students in the IUG program must satisfy the requirements for both the B.S. and M.S. degrees, as listed in Appendix A. The first three years of the IUG program are identical to the first three years of the Bachelor of Science program. The fourth year of the IUG program differs from the
fourth year of the Bachelor of Science program because of the inclusion of courses that count toward the Master of Science degree requirements.

Student performance will be monitored on an on-going basis by the student’s adviser and Graduate Programs. Students admitted to the integrated program must maintain a minimum cumulative GPA of a 3.3 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. (See information on Grade-Point Average in the Graduate Bulletin: [http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=masters](http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=masters).)

For SHC students in the IUG program, students must maintain a minimum cumulative GPA of 3.4 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. (See Grade Point Average Requirement in the SHC Student Handbook: [https://www.shc.psu.edu/documents/academic/handbook/handbook_1415.pdf](https://www.shc.psu.edu/documents/academic/handbook/handbook_1415.pdf).) Successful completion of a Schreyer Scholar’s Master’s thesis will be accepted as completion of the honors thesis requirement.

If for any reason a student admitted to the B.S./M.S. program is unable to complete the requirement for the Master of Science degree program in Information Sciences and Technology, the student will be permitted to receive the Bachelor’s degree assuming all degree requirements have been satisfactorily completed.

As stated in the Graduate Bulletin, a minimum grade-point average of 3.00 for work done at the University is required for graduation and to maintain good academic standing. See [http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=masters](http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=masters)

### Appendix A. Recommended Schedule for Information Sciences and Technology Program

**Typical schedule for master’s degree students.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (18 credits)</td>
<td>IST 504 Foundations of Theories and Methods of Information Sciences and Technology Research (3)</td>
<td>IST 505 Foundations of Research Design in Information Sciences and Technology (3)</td>
</tr>
<tr>
<td></td>
<td>Methods Course (3)</td>
<td>Methods Course (3)</td>
</tr>
<tr>
<td></td>
<td>Specialty Course (3)</td>
<td>Specialty Course (3)</td>
</tr>
<tr>
<td>2 (12 credits)</td>
<td>Specialty Course (3)</td>
<td>Specialty Course (3)</td>
</tr>
<tr>
<td></td>
<td>Thesis Research (3)</td>
<td>Thesis Research (3)</td>
</tr>
</tbody>
</table>
## Appendix B. Recommended Schedule for Information Sciences and Technology IUG Students

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Spring</th>
<th>MS Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 (Senior Undergraduate Year)</td>
<td>IST 504 Foundations (3)</td>
<td>IST 505 Research Design (3)</td>
<td>30*</td>
</tr>
<tr>
<td></td>
<td>Methods course (3)**</td>
<td>Methods course (3)**</td>
<td></td>
</tr>
<tr>
<td>Year 2 (Super Senior Undergraduate Year)</td>
<td>IST 600 or IST 594 Thesis Research (3)</td>
<td>IST 600 or IST 594 Thesis Research (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grad Specialty Course (3)***</td>
<td>Grad Specialty Course (3)***</td>
<td></td>
</tr>
</tbody>
</table>

* Students admitted to the IUG program may double count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. In their senior year, IUG students will take 6 credits of specified graduate work, courses IST 504 and IST 505, and 6 credits of methods courses. These 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate IST/B.S. support of option requirement. In their super senior year, students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees. These courses must be at the 400-level or above. Students may choose any 400-level undergraduate Option course (IST 411, IST 412, IST 413, IST 420, IST 421, IST 431, IST 432) that they are using to fulfill an undergraduate option requirement and apply the credits to both the undergraduate option requirement and the graduate specialty course requirement. Credits associated with the thesis or culminating scholarly paper, i.e., IST 600 and IST 594, may not be double-counted. However, for Schreyer Honors College students, the Master’s thesis deliverable, itself, may double-count for the undergraduate thesis deliverable requirement.

** Choose graduate level methods course after consultation in advance with the student’s faculty adviser.

*** Choose any 400 or 500 level course that contributes to the student’s chosen area of specialty with a maximum of six credits at the 400 level.

It is crucial that the IUG student begin involvement in the master’s thesis research very early in their education. The general focus and design of the master’s thesis should be identified by no later than the end of the fall undergraduate senior year, preferably in the core M.S. courses. The master’s thesis research committee is chaired by a graduate faculty member and reviewed and approved by three graduate faculty members, with one outside member sometimes selected as a member. The thesis research credits (IST 600) are generally supervised by the chair. The master’s thesis produces a work that adds significant new knowledge to a given field. The initial proposal should be completed by the fall of year one in graduate school in order to be completed successfully the following spring or summer. IUG students may elect, in consultation with their
adviser to complete a scholarly research paper to fulfill the master’s research requirement. The Master’s Degree Handbook (attached) details the differences in these two options.

The total resulting credits will be a minimum of 155 credits, with 125 credits completed for the undergraduate IST degree. Twelve graduate credits will be completed in the senior year, and the remaining 18 graduate credits will be completed in the super senior year.

Appendix C. External Consultation

Summary of External Consultation

<table>
<thead>
<tr>
<th>Program Requested</th>
<th>Date of Request</th>
<th>Date of Response</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penn State Great Valley</td>
<td>6/29/15</td>
<td>7/13/15</td>
<td>No objections</td>
</tr>
<tr>
<td>Information Science (IN SC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penn State Harrisburg</td>
<td>6/29/15</td>
<td>7/14/15</td>
<td>Support the IUG program</td>
</tr>
<tr>
<td>Information Systems (INFSY)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schreyer Honors College</td>
<td>6/29/15</td>
<td>7/15/15</td>
<td>Very supportive, minor concerns addressed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From: JAMES A NEMES [mailto:jan16@psu.edu]
Sent: Wednesday, July 15, 2015 9:20 AM
To: Michelle Hill <mhill@ist.psu.edu>
Subject: RE: Consultation Requested by 7/13: IUG programs in IST

Michelle,

The proposed IUG programs have no impact on our programs and we have no objections. I have just one comment for your consideration. The distinction between the thesis and the scholarly paper is somewhat nebulous to me, with both leading to the M.S. Degree. Given the proposed schedule, it appears that students in the IUG program make the choice between those two options while still undergraduates, so I would anticipate there would need to be some fairly intensive advising providing the pros and cons of these two alternatives.

Best of luck with the initiative.
Jim

James A. Nemes, D.Sc.
Interim Chancellor
Director of Academic Affairs
Professor of Mechanical Engineering
From: Michelle Hill  
Sent: Monday, June 29, 2015 1:39 PM  
To: 'jan16@psu.edu'; 'ghs2@psu.edu'; 'cbrady@psu.edu'  
Subject: Consultation Requested by 7/13: IUG programs in IST  
Importance: High

Hello,

The College of IST is working on proposals for three new Integrated Undergraduate-Graduate (IUG) degree programs, and we’d like your input.

In case you are not familiar with this type of program, ideal candidates for IUG degree programs are students who have a strong interest in research and graduate study. This program will allow students to double-count a maximum of 12 credits towards their graduate and undergraduate degrees and obtain both degrees in five years.

The three attached proposals are for the following combined programs:

- BS in Information Sciences and Technology and MS in Information Sciences and Technology
- BA in Information Sciences and Technology and MS in Information Sciences and Technology
- BS in Security and Risk Analysis and MS in Information Sciences and Technology

Would you please review the proposals and let us know if you have any comments. The proposals have been reviewed by the Graduate School and we will be submitting them for the first Joint Curricular Committee meeting in September.

Please submit your comments to me by July 13.

Thank you,
Michelle

Michelle M. Hill  
Administrative Support Coordinator  
Graduate Programs | 321F IST Building | University Park, PA 16802  
(814)863-9455 | www.ist.psu.edu  
Grad Programs Intranet: https://intranet.ist.psu.edu/grad_prog

From: GIRISH SUBRAMANIAN [mailto:ghs2@psu.edu]  
Sent: Tuesday, July 14, 2015 1:20 PM
I support the IUG programs.

Girish Subramanian

From: Michelle Hill  
Sent: Monday, June 29, 2015 1:39 PM  
To: 'jan16@psu.edu'; 'ghs2@psu.edu'; 'cbrady@psu.edu'  
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Graduate Programs | 321F IST Building | University Park, PA 16802  
(814)863-9455 | www.ist.psu.edu  
Grad Programs Intranet: https://intranet.ist.psu.edu/grad_prog

From: Brady, Christian M. [mailto:cmb44@psu.edu]  
Sent: Wednesday, July 15, 2015 1:41 AM
To: Michelle Hill <mhill@ist.psu.edu>; 'jan16@psu.edu' <jan16@psu.edu>; ghs2@psu.edu  
Cc: jxb8@psu.edu; kms28@psu.edu; Mellott, Lisa <lk3@psu.edu>; Gutgold, Nichola <dgn2@psu.edu>  
Subject: Re: Consultation Requested by 7/13: IUG programs in IST

Michelle

I am very supportive of this proposal! I will leave the content up to the experts in the field. Regarding Schreyer Scholars, you note on p. 5 (and on p. 13)

For Schreyer Honors College students, students must also follow guidelines and procedures for applying for IUG in the Schreyer Honors College:
http://www.shc.psu.edu/students/iug/program/

That is only for students wishing to do an IUG in an area that does not have an existing IUG program such as the one being set up here. Once this is set up and approved, SHC Scholars would simply go through the same process as the other students. The only note you might want to make is that for Schreyer Scholars successful completion of their Master Thesis will be accepted as completion of their honors thesis.

Just a couple of textual notes:

- P. 9 should be updated with Dean Sears' information.
- P. 15 the graduate programs coordinator is blank (I assume the position is being filled)

--
cbrady @ psu.edu

Christian M M Brady, DPhil (Oxon.)
Dean, Schreyer Honors College
The Pennsylvania State University
http://shc.psu.edu/
http://engage.shc.psu.edu/
814-865-2631

AIM: drcbrady
twitter: shcdean

"Shaping people who shape the world."™

From: Michelle Hill  
Sent: Monday, June 29, 2015 1:39 PM  
To: 'jan16@psu.edu'; 'ghs2@psu.edu'; 'cbrady@psu.edu'  
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(814)863-9455 | www.ist.psu.edu
Grad Programs intranet: https://intranet.ist.psu.edu/grad_prog

Appendix D. University Graduate Bulletin
(Updated material marked in **bold**)

Information Sciences and Technology (IST)

Program Home Page

ANDREW SEARS, Dean, College of Information Sciences and Technology
MARY BETH ROSSON, Associate Dean for Graduate and Undergraduate Studies

Office of the Dean
College of Information Sciences and Technology
The Pennsylvania State University
332 Information Sciences and Technology Building
University Park, PA 16802-6823
Dean's office: 814-865-3528; Graduate office: 814-865-8711

Degrees Conferred
The Graduate Faculty

- John W. Bagby, J.D. (UNIVERSITY OF TULSA), Professor of Information Sciences and Technology
- Guoray Cai, Ph.D. (UNIVERSITY OF PITTSBURGH), Associate Professor of Information Sciences and Technology, Geography, and Computer Science and Engineering
- Brian H. Cameron, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Associate Dean for Professional Master’s Programs, Clinical Professor of Management Information Systems, Smeal College of Business; Affiliate Faculty of Information Sciences and Technology
- John Carroll, Ph.D. (COLUMBIA UNIVERSITY), Distinguished Professor of Information Sciences and Technology
- Eun Kyoung Choe, Ph.D. (UNIVERSITY OF WASHINGTON), Assistant Professor of Information Sciences and Technology
- Chao-Hsien Chu, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Professor of Information Sciences and Technology; Affiliate Professor of Management Science and Information Systems
- Shawn Clark, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Senior Lecturer in Information Sciences and Technology
- Frederico T. Fonseca, Ph.D. (UNIVERSITY OF MAINE AT ORONO), Associate Professor of Information Sciences and Technology; Affiliate Assistant Professor of Geography
- Peter K. Forster, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Associate Dean for Online Programs and Professional Education; Senior Lecturer in Information Sciences and Technology
- C. Lee Giles, Ph.D. (UNIVERSITY OF ARIZONA), Interim Associate Dean for Research; David Reese Professor of Information Sciences and Technology; Professor of Computer Science and Engineering
- Edward J. Glantz, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Senior Lecturer in Information Sciences and Technology
- Jacob L. Graham, M.A. (UNIVERSITY OF OKLAHOMA), Professor of Practice in Security and Risk Analysis
- Jens Grossklags, Ph.D. (UNIVERSITY OF CALIFORNIA BERKELEY), Assistant Professor of Information Sciences and Technology
- David L. Hall, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Professor of Information Sciences and Technology, and Electrical Engineering
- John T. Harwood, Ph.D. (UNIVERSITY OF NEBRASKA, LINCOLN), Associate Vice Provost for Information Technology; Associate Professor of Information Sciences and Technology; Associate Professor of English
- Steven R. Haynes, Ph.D. (LONDON SCHOOL OF ECONOMICS), Senior Lecturer in Information Sciences and Technology
- Vasant Honavar, Ph.D. (UNIVERSITY OF WISCONSIN-MADISON), Professor and Edward Frymoyer Chair of Information Sciences and Technology and Bioinformatics and Genomics; Affiliate Professor of Huck Institutes of the Life Sciences
- Bernard James Jansen, Ph.D. (TEXAS A & M UNIVERSITY), Professor of Information Sciences and Technology
- Lynette Kvasny, Ph.D. (GEORGIA STATE UNIVERSITY), Associate Professor of Information Sciences and Technology
- Dongwon Lee, Ph.D. (UNIVERSITY OF CALIFORNIA LOS ANGELES), Associate Professor of Information Sciences and Technology; Computer Science and Engineering
- Zhenhui (Jessie) Li, Ph.D. (UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN), Assistant Professor of Information Sciences and Technology
- Peng Liu, Ph.D. (GEORGE MASON UNIVERSITY), Professor of Information Sciences and Technology; Computer Science and Engineering
- Alan M. MacEachren, Ph.D. (UNIVERSITY OF KANSAS), Professor of Geography; Affiliate Faculty of Information Sciences and Technology
- Carleen Maitland, Ph.D. (DELFt UNIVERSITY OF TECHNOLOGY), Associate Professor of Information Sciences and Technology
- Michael D. McNeese, Ph.D. (VANDERBILT UNIVERSITY), Professor of Information Sciences and Technology and Psychology
- Scarlett H. Miller, Ph.D. (UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN), Assistant Professor of SEDTAPP and Industrial Engineering; Affiliate Faculty of Information Sciences and Technology
- Prasenjit Mitra, Ph.D. (STANFORD UNIVERSITY), Professor of Information Sciences and Technology, and Computer Science and Engineering
Program Description

The Doctor of Philosophy degree in Information Sciences and Technology offers advanced graduate education for students contemplating careers in academic teaching and research, or research in a non-academic setting. The program is interdisciplinary in nature and expects scholarship at the highest level exhibiting depth of competency in at least one of the core areas of the Information Sciences and Technology and an understanding of the integration of the critical constructs that drive the field: people, information, and technology.

The Master of Science in Information Sciences and Technology is an interdisciplinary degree program that focuses on the theoretical, application-oriented, and educational issues facing a digital, global economy. The program is designed to build an understanding of how information and technology
fundamentally impact (and are impacted by) people, organizations, and the world community. Topical areas within IST span a broad range including: human computer interaction, computational techniques, applications (e.g., bio-informatics and geographical information systems), societal issues (such as digital divide issues), user issues (e.g., computer-aided cognition), and information systems design and development providing exposure and grounding in many of the aspects of the information sciences. The program is especially attractive to students interested in gaining state-of-the-art understanding of information technology and its use as a solution in multiple venues.

The Master of Professional Studies in Information Sciences (MPS-IS) is an innovative program that targets professionals and organizational leaders who wish to seek a professional education and training program. The purpose of the professional master’s program is to produce professionals and organizational leaders who not only can select and draw upon the necessary foundations within the information sciences and information technology areas, test the applicability of these foundations for addressing a given issue, and apply resulting solutions, but also can be aware of the multitude of technological trends and environmental factors that organizations must address in the changing global economy.

The MPS-IS equips students to be able to:

1. Understand and analyze the profound information and technological changes sweeping the world;
2. Meet the challenges by developing innovative solutions using the foundations of information sciences and technology; and
3. Have a clear advantage in today’s highly competitive and dynamic environment by continuously learning new trends, issues, and innovations.

Admission Requirements

Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor’s degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Applicants to the Professional Master Program are required to submit scores from the general portions of the Graduate Record Examinations (GRE) or the Graduate Management Admissions Test (GMAT), three letters of reference, and a one-three page personal statement of relevant experience and goals. The GRE or GMAT requirement may be waived for applicants to the Professional Master’s Program if the student has five or more years of relevant information sciences and technology working experience. Applicants to the Ph.D. and M.S. programs are required to submit scores from the general portions of the Graduate Record Examinations (GRE), three letters of reference, a current resume (including present position and any publications), one-three page statement of research background and goals related to pursuing an advanced degree and career in IST, which (also briefly discusses your personal motivation for obtaining a Ph.D. or M.S.), and a sample of the applicant’s writing (e.g., technical paper, etc.).

Because the program is multidisciplinary in nature, students from many different disciplines may be acceptable for entry into the program. A bachelor’s degree in a related area (e.g., engineering
and science), while not necessary for admission, is helpful in the successful completion of the degree. It is expected that students will have a basic level of competency in statistics, as well as computer and information technology. Related work experience can be used to demonstrate such competency. A student may be accepted into the program with “provisional status” for no more than one year while work is completed to meet these expectations.

It is expected that the successful applicant will have an overall grade point average of 3.00 (on a 4.00 scale) or higher for his or her undergraduate study (and/or graduate-level study). However, accomplishments demonstrated through work experience and recommendation letters from the applicant’s academic adviser or employer will also play an important role in making the admission decision. The most qualified applicants will be accepted into the program until all spaces for new students are filled.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 22 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Degree Requirements

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

The doctoral degree requirements include the general requirements of the Graduate Council as listed under the Doctoral Degree Requirements. To complete a Ph.D. degree, students must in their first semester take the 6-credit introduction to interdisciplinary research methods (IST 501), one of the three foundations courses (IST 510, IST 520, IST 530), and one credit of graduate colloquium (IST 590). In their second semester, students must take the remaining two foundations courses and a second credit of graduate colloquium.

In addition to these first-year requirements, doctoral students must complete 12 credits of research methodology courses selected to introduce or amplify proficiency in methods relevant to their doctoral research agenda, and 12 credits of specialization courses, also selected to reinforce their research training.

In addition, all candidates must be competent in the English language and must have demonstrated skills in the communication of ideas both verbally and in writing commensurate with the requirement of scholarly and professional work. The candidacy examination will be used as an occasion to assess English
proficiency and plan for remediation (including additional courses, mentoring, or experiences) for all students. A brief critical literature review in three complementary research areas will be included as part of the candidacy assessment process. The foreign language and communication requirement may be fulfilled through demonstrating computer language proficiency (assessed through courses taken) or a minimum of 9 credits of 500-level statistics courses. Students must have completed 18 graduate credits before taking the candidacy exam and must complete the candidacy exam within three semesters. Students must pass the Ph.D. comprehensive examination after completion of most of the course work, usually at the end of the student's second year in the program. A research-based dissertation must be completed under the direction of the Ph.D. committee, with the student submitting a dissertation proposal and defending that proposal in the defense examination.

General guidance of a doctoral candidate is the responsibility of a doctoral committee consisting of four or more active members of the Graduate Faculty, which includes at least two faculty members in the major field. The dissertation adviser must be a member of the doctoral committee. The dissertation adviser usually serves as chair, but this is not required. If the candidate is also pursuing a dual-title field of study, a co-chair representing the dual-title field must be appointed.

At least one regular member of the doctoral committee must represent a field outside the candidate’s major field of study in order to provide a broader range of disciplinary perspectives and expertise. This committee member is referred to as the "Outside Field Member." In cases where the candidate is also pursuing a dual-title field of study, the dual-title representative to the committee may serve as the Outside Field Member.

Additionally, in order to avoid potential conflicts of interest, the primary appointment of at least one regular member of the doctoral committee must be in an administrative unit that is outside the unit in which the dissertation adviser’s primary appointment is held (i.e., the adviser’s administrative home; in the case of tenure-line faculty, this is the individual’s tenure home). This committee member is referred to as the "Outside Unit Member." In the case of co-advisers, the Outside Unit Member must be from outside the administrative home(s) of both co-advisers. In some cases, an individual may have a primary appointment outside the administrative home of the student’s dissertation adviser and also represent a field outside the student’s major field of study; in such cases, the same individual may serve as both the Outside Field Member and the Outside Unit Member.

M.S. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

The M.S. in Information Sciences and Technology requires a minimum of 30 credits at the 400 level or above, with at least 18 credits at the 500 or 600 level or above; 27 of the 30 credits must be earned at University Park. A minimum of 12 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major program. These 30 credits are distributed among the following requirements:

The M.S. in Information Sciences and Technology requires a minimum of 30 credits at the 400 level or above, with at least 18 credits at the 500 level or above; 27 of the 30 credits must be earned at University Park. These credits are distributed among the following requirements:
Core Courses (6 credits). All candidates are expected to develop a broad understanding of the core constructs of people, information, technology, and the significant interactions among those elements by taking IST 504 and IST 505.

Specialization Courses (12 credits). In consultation with his/her adviser, a candidate is expected to choose courses in one or more areas customized to support the thesis or scholarly paper requirement. In addition to advanced courses in IST, a support area could be in law, business, education, engineering, the liberal arts, science, or any area that is linked to the information sciences.

Research Methods (6 credits). All candidates must develop a basic understanding of the research methods utilized in the information sciences, by taking at least two research methods courses offered in IST or elsewhere. The focus of the course must be on the methods being learned rather than application of some method to a research topic.

Thesis or Scholarly paper (6 credits). Students may choose a thesis or scholarly paper option. Students who choose the thesis option must register for 6 credits of IST 600, write a thesis satisfactory thesis accepted by the master’s committee, the head of the graduate program, and the Graduate School, and pass a thesis defense, orally defend the thesis to the thesis committee, and register for 6 credits of IST 600. The thesis should focus on a well-defined problem relevant to the information sciences. Students who choose the scholarly paper option must register for 6 credits of IST 594 and complete a scholarly paper, and register for 6 credits of IST 594. The scholarly paper is to be a focused piece of technical work that applies the student’s expertise and knowledge base, and that is documented and presented as a scholarly paper. Students who choose the scholarly paper option must write a scholarly paper and submit to that is accepted by their M.S. committee. An oral presentation is at the discretion of the student’s adviser.

Language and Communication. All candidates must be competent in the English language and must have demonstrated skills in the communication of ideas both orally and in writing commensurate with the requirement of professional work. The foreign language and communication requirement may be fulfilled through demonstrating computer language proficiency (assessed through courses taken).

IUG Degree Requirements

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor’s and master’s degree in a shorter period of time than would be necessary if the degrees were pursued separately. There are three approved IUG programs: an Integrated B.A. in Information Sciences and Technology and M.S. in Information Sciences and Technology, an Integrated B.S. in Information Sciences and Technology and M.S. in Information Sciences and Technology, and an Integrated B.S. in Security and Risk Analysis and M.S. in Information Sciences and Technology.

–The first two to three years of undergraduate coursework follow the same undergraduate curriculum that other students follow in the Information Sciences and Technology major. Information Sciences and Technology undergraduates may apply for admission to the IUG program as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in a College of IST undergraduate degree program.
2. Must have completed 60 credits of an IST undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST. Students must complete the Graduate School application.

5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.

6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.

7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)

8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

If admitted to the IUG, the final years of study include graduate courses, IST 504 (fall), and IST 505 (spring), plus two semesters of graduate research, six credits of research methods courses, and twelve credits of specialty courses. To earn the M.S. degree, students in the IUG program must complete all of the degree requirements for the M.S. degree, described above. If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

For Schreyer Honors College students, students should follow guidelines and procedures for applying for an IUG in the Schreyer Honors College.

http://www.she.psu.edu/students/iug/program/

Students admitted to the IUG program may double-count a maximum of 12 credits to their graduate and undergraduate degrees in Information Sciences and Technology. Double-counted credits must be at the 400-level or higher. No more than 6 credits may be at the 400 level. The required 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate program. Students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees from the following: IST 411, IST 412, IST 413, IST 420, IST 421, IST 431, IST 432.

Credits associated with the thesis or culminating scholarly paper, i.e., IST 600 and IST 594, respectively, may not be double-counted. However, for Schreyer Honors College students, the Master’s thesis deliverable, itself, may double-count for the undergraduate thesis deliverable requirement. For specific course requirements, refer to the IUG M.S. Handbook.

M.P.S. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.
The MPS-IS program requires a minimum of 33 credits, 24 of which must be earned at Penn State. At least 18 credits must be courses at the 500 level and above. A maximum of 9 transfer credits of high-quality graduate work may be applied toward the requirements for the degree, subject to restrictions outlined in the Transfer Courses section of the *Graduate Bulletin*. Up to 9 graduate credits may be transferred in from a regionally accredited institution (as is permissible by the Graduate School). A student can choose to be in the Base Program or in the Cybersecurity and Information Assurance (CIA) Option. These 33 credits are distributed among the following requirements and reflected by completion of 3 credits of IST 594. A student will first take 9 credits of core courses. The student will then take 12 credits of prescribed courses for either the base program or the Cybersecurity and Information Assurance Option. An additional 9 credits are elective courses. Lastly, the student must complete a master’s project guided by the student’s adviser and completed while enrolled in IST 594. A student can choose to be in the Base Program or in the Cybersecurity and Information Assurance (CIA) Option. These credits are distributed among the following requirements and reflected by completion of 3 credits of IST 594.

**Core Courses (9 credits).** The core of the MPS-IS consists of three courses -- IST 852 or INFSY 540, IST 554, and IST 816. These courses represent the core technical foundations to study Information Sciences and Technology.

**The Base Program (12 credits of prescribed courses and 9 credits of electives).** The base program consists of four prescribed (required) courses - IST 815, IST 521 (or IST 522), IST 532, (or IST 531) and IST 564, and 9 credits of elective courses, in addition to the 9-credit core and 3-credit capstone course. It is designed for students who do not have a special interest in mind. The elective courses are chosen in consultation with the student’s adviser. Hence, it offers the flexibility that enables the student to build an in-depth knowledge and skills about information sciences tailored to his/her interests and background. Students from the Harrisburg region can also select courses from Penn State Harrisburg to fulfill the prescribed courses (by substitution) and 9 credits of electives.

**Cybersecurity and Information Assurance (CIA) Option (12 credits of prescribed courses and 9 credits of electives).** The CIA option consists of four prescribed (required) courses, IST 815, IST 555, IST 456, and IST 885, and 9 credits of elective courses selected from IST 451, 454, 564, or IN SC 561 or other courses from a list of approved electives that is maintained by the head of the graduate program and is available from the program office, in addition to the 9-credit core and 3-credit capstone courses. These courses enable the student to focus on developing knowledge and skills for information analysis, information assurance, and decision support, including theories, techniques, and applications of data mining, data fusion, information search, information security, and intelligent resource allocation.

**Master Project (3 credits).** The project requires all students in the MPS-IS to focus on a well-defined issue or problem relevant to the information sciences and technology. The student will submit a project proposal to his/her faculty adviser for approval. Upon completion of the project, the student will share or present the project results at a final presentation as a component of IST 594.

**Language and Communication.** All candidates must be competent in the English language and must have demonstrated skills in the communication of ideas both orally and in writing commensurate with the requirement of professional work. The foreign language and communication requirement may be fulfilled through demonstrating computer language proficiency (assessed through courses taken).

**Courses**
Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

INFORMATION SCIENCES AND TECHNOLOGY (IST) course list
Graduate Council
Program, Option, or Minor Proposal Form

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Curriculum Coordinator, University Faculty Senate, 101 Kern Graduate Building, University Park. The proposals will be transmitted to the Office of the Dean of the Graduate School for entry into the Graduate Council curricular review process; for more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

College/School: College of Information Sciences and Technology
Department or Instructional Area: Information Sciences and Technology

New Graduate Program, Option, or Minor: [ ] Add

Designation of new graduate program: Integrated Bachelor of Science in SRA and Master of Science Degree in IST
Classification of Instructional Programs (CIP) Code: 11.0103
Designation of new graduate option:
Designation of new graduate minor:

Indicate effective semester:
[ ] First semester following approval
[ ] Second semester following approval

Existing Graduate Program Option, or Minor: [ ] Change [ ] Drop

Current designation of graduate program:
Current designation of graduate option:
Current designation of graduate minor:

New designation of existing graduate program (if changing):
New designation of existing graduate option (if changing):
New designation of existing graduate minor (if changing):

Brief description of the change (if not noted above):

Indicate effective semester:
[ ] First semester following approval
[ ] Second semester following approval

Submitted by Graduate Program Head
Dr. Mary Beth Rosson, Assoc. Dean
Printed name
Signature
Date: 8/10/15

Noted by College/School Representative to Graduate Council Subcommittee on New and Revised Programs and Courses:
Dr. Dinghao Wu, Asst. Professor
Printed name
Signature
Date: 8/21/2015

Approved by College/School Dean/Chancellor (or Designee):
Dr. Andrew Sears, Dean
Printed name
Signature
Date: 8/14/15
Recommended by Chair, Graduate Council Subcommittee on New and Revised Programs and Courses:

On Behalf of Luis Ayala

Printed name

Signature

Date: 10/14/2015

Recommended by Chair, Graduate Council Committee on Programs and Courses:

On Behalf of Andris Freivalds

Printed name

Signature

Date: 10/14/2015

Noted by Dean of the Graduate School:

On Behalf of Regina Vasilatos-Younken

Printed name

Signature

Date: 10/14/2015
Program Change Proposal to create an Integrated Undergraduate – Graduate (IUG) Degree Program combining the B.S. in Security and Risk Analysis with the M.S. in Information Sciences and Technology

Graduate Program in Information Sciences and Technology

College of Information Sciences and Technology

Penn State-University Park

July 2015
Information Sciences and Technology
Integrated Undergraduate-Graduate (IUG) Degree Program Proposal
(M.S. with B.S. in Security and Risk Analysis)

Executive Summary

A. Objective of the Proposed IUG Program

The objectives of the Integrated Undergraduate Graduate Program in Information Sciences and Technology include:

1. To offer highly qualified students the opportunity to earn two degrees in less time than it would take to do two sequential degrees. In particular, IUG students may count up to 12 credits towards both their B.S. in S.R.A. and M.S. degree requirements.
2. To permit coherent planning of studies through the graduate degree, with advising informed by not only the requirements of the baccalaureate program, but also the longer-range goals of the graduate degree.
3. To introduce undergraduate students to the rigors of both graduate study and graduate faculty.
4. To make the resources of the Graduate School available to IUG students.
5. To allow students with IUG status to benefit from their association with graduate students whose level of work and whose intensity of interest and commitment parallel their own.
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I. INTRODUCTION

The integrated B.S. in SRA/M.S. (IUG) degree in Information Sciences and Technology meets the needs of the most academically talented students in the Information Sciences & Technology undergraduate major. A proportion of these successful students wish to pursue graduate studies sometime after graduation. Offering the IUG benefits these students by offering an accelerated path to a graduate degree. Additionally, the IUG program can provide these students with a more cohesive program of study with opportunities to engage in more comprehensive research leading to both the Bachelor’s and Master’s degree.

While we have allowed honors students to complete an IUG through the Schreyer Honors College IUG program, we seek to formalize an IUG program in the College of IST for all students. The College of IST has a good number of undergraduate students—honors and non-honors qualified—involved in research (approximately 10% according to a recent informal survey of faculty); and there has been steady interest in an IUG offering for non-honors undergraduate students. The IUG program will allow us to recruit excellent students into our undergraduate program and will offer these students a head start on graduate education.

II. APPLICATION PROCESS

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Information Sciences and Technology Form, a transcript, and two letters of recommendation (both from faculty members) to the IST Graduate Programs Office. The Director of Undergraduate Academic Affairs, in consultation with the Graduate Programs Coordinator, will help undergraduate candidates determine a proposed sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. Acceptance into the IST IUG program will be determined by the Graduate Recruitment Committee.

Information Sciences and Technology undergraduates may apply for admission as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in a College of IST undergraduate degree program.
2. Must have completed 60 credits of an IST undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must apply to and be accepted without reservation into The Graduate School and M.S. program in IST. Students must complete the Graduate School application.
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study.
7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

For Schreyer Honors College students, students should follow guidelines and procedures for applying for IUG in the Schreyer Honors College:

http://www.shc.psu.edu/students/iug/program/

In addition, applicants must apply to and be admitted to the Graduate School of the Pennsylvania State University at the time of their application to the IUG degree program.

These admission standards are high, as it is thought the program will only be appropriate for students with high levels of academic skills. The program area does have discretion in admitting Information Sciences and Technology majors into the integrated program, and extenuating circumstances can always be considered in terms of possible admission. Individuals who are unable to be admitted into the integrated program of study can apply for regular admission to the graduate program when they complete their undergraduate program of study.

Upon acceptance into the program, the student will be assigned a graduate adviser who is a graduate faculty member. In addition, the student will plan the remainder of his or her undergraduate program of studies to complement the proposed plan of study.

**Eligibility for a Graduate Assistantship**

Students in the IUG program will be eligible for consideration for a graduate assistantship to be awarded once admitted to the IUG program.

**III. IUG DEGREE REQUIREMENTS**

The IUG program in Information Sciences and Technology is intended to provide accelerated graduate study in information sciences and technology for promising undergraduate students, while emphasizing the development of advanced core information science knowledge and research skills. The IUG program is intended to prepare individuals for research-oriented careers in fields such as health, education, and government. Some graduates of the master's degree program in Information Sciences and Technology may opt to pursue doctoral studies.

Students in the IUG program must satisfy the requirements for both the B.S. and M.S. degrees, as listed in Appendix A. The first three years of the IUG program are identical to the first three years of the Bachelor of Science in the Security and Risk Analysis program. The fourth year of
the IUG program differs from the fourth year of the Bachelor of Science program because of the inclusion of courses that count toward the Master of Science degree requirements.

Student performance will be monitored on an on-going basis by the student’s adviser and Graduate Programs. Students admitted to the integrated program must maintain a minimum cumulative GPA of a 3.3 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. (See information on Grade-Point Average in the Graduate Bulletin: [http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=masters](http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=masters).)

For SHC students in the IUG program, students must maintain a minimum cumulative GPA of 3.4 overall and a minimum 3.0 GPA in all courses used toward the M.S. degree in order to maintain good academic standing and meet graduation requirements. (See Grade Point Average Requirement in the SHC Student Handbook: [https://www.shc.psu.edu/documents/academic/handbook/handbook_1415.pdf](https://www.shc.psu.edu/documents/academic/handbook/handbook_1415.pdf).) Successful completion of a Schreyer Scholar’s Master’s thesis will be accepted as completion of the honors thesis requirement.

If for any reason a student admitted to the B.S./M.S. program is unable to complete the requirement for the Master of Science degree program in Information Sciences and Technology, the student will be permitted to receive the Bachelor’s degree assuming all degree requirements have been satisfactorily completed.

As stated in the Graduate Bulletin, a minimum grade-point average of 3.00 for work done at the University is required for graduation and to maintain good academic standing. See [http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=masters](http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=masters)

**Appendix A. Recommended Schedule for Information Sciences and Technology Program**

Typical schedule for master’s degree students.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (18 credits)</td>
<td>IST 504 Foundations of Theories and Methods of Information Sciences and Technology Research (3)</td>
<td>IST 505 Foundations of Research Design in Information Sciences and Technology (3)</td>
</tr>
<tr>
<td></td>
<td>Methods Course (3)</td>
<td>Methods Course (3)</td>
</tr>
<tr>
<td></td>
<td>Specialty Course (3)</td>
<td>Specialty Course (3)</td>
</tr>
<tr>
<td>2 (12 credits)</td>
<td>Specialty Course (3)</td>
<td>Specialty Course (3)</td>
</tr>
<tr>
<td></td>
<td>Thesis Research (3)</td>
<td>Thesis Research (3)</td>
</tr>
</tbody>
</table>
## Appendix B. Recommended Schedule for Information Sciences and Technology IUG Students

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Spring</th>
<th>MS Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 (Senior Undergraduate Year)</td>
<td>IST 504 Foundations (3) IST 600 or IST 594 Thesis Research (3) Methods course (3)**</td>
<td>IST 505 Research Design (3) IST 600 or IST 594 Thesis Research (3) Methods course (3)**</td>
<td>30*</td>
</tr>
<tr>
<td>Year 2 (Super Senior Undergraduate Year)</td>
<td>Grad Specialty Course (3)***</td>
<td>Grad Specialty Course (3)***</td>
<td></td>
</tr>
</tbody>
</table>

* Students admitted to the IUG program may double count a maximum of 12 credits toward their graduate and undergraduate degrees in Information Sciences and Technology. In their senior year, IUG students will take 6 credits of specified graduate work, courses IST 504 and IST 505, and 6 credits of methods courses. These 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate IST/SRA support option requirement. In their super senior year, students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees. These courses must be at the 400-level or above. Students may choose any 400-level undergraduate Option course (SRA 433, SRA 468, SRA 471, IST 451, IST 452, IST 454, IST 456) that they are using to fulfill an undergraduate option requirement and apply the credits to both the undergraduate option requirement and the graduate specialty course requirement. Credits associated with the thesis or culminating scholarly paper, i.e., IST 600 and IST 594, may not be double-counted. However, for Schreyer Honors College students, the Master’s thesis deliverable, itself, may double-count for the undergraduate thesis deliverable requirement.

** Choose graduate level methods course after consultation in advance with the student’s faculty adviser.

*** Choose any 400 or 500 level course that contributes to student’s chosen area of specialty with a maximum of six credits at the 400 level.

It is crucial that the IUG student begin involvement in the master’s thesis research very early in their education. The general focus and design of the master’s thesis should be identified by no later than the end of the fall undergraduate senior year, preferably in the core M.S. courses. The master’s thesis research committee is chaired by a graduate faculty member and reviewed and approved by three graduate faculty members, with one outside member sometimes selected as a member. The thesis research credits (IST 600) are generally supervised by the chair. The master’s thesis produces a work that adds significant new knowledge to a given field. The initial proposal should be completed by the fall of year one in graduate school in order to be completed successfully the following spring or summer. IUG students may elect, in consultation with their...
adviser to complete a scholarly research paper to fulfill the master’s requirement. The Master’s Degree Handbook (attached) details the differences in these two options.

The total resulting credits will be a minimum of 150 credits, with 120 credits completed for the undergraduate SRA degree. Twelve graduate credits will be completed in the senior year, and the remaining 18 graduate credits will be completed in the super senior year.

**Appendix C. External Consultation**

Summary of External Consultation

<table>
<thead>
<tr>
<th>Program Requested</th>
<th>Date of Request</th>
<th>Date of Response</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penn State Great Valley Information Science (IN SC)</td>
<td>6/29/15</td>
<td>7/13/15</td>
<td>No objections</td>
</tr>
<tr>
<td>Penn State Harrisburg Information Systems (INFSY)</td>
<td>6/29/15</td>
<td>7/14/15</td>
<td>Support the IUG program</td>
</tr>
<tr>
<td>Schreyer Honors College</td>
<td>6/29/15</td>
<td>7/15/15</td>
<td>Very supportive, minor concerns addressed</td>
</tr>
</tbody>
</table>

From: JAMES A NEMES [mailto:jan16@psu.edu]

**Sent:** Wednesday, July 15, 2015 9:20 AM

**To:** Michelle Hill <mhill@ist.psu.edu>

**Subject:** RE: Consultation Requested by 7/13: IUG programs in IST

Michelle,

The proposed IUG programs have no impact on our programs and we have no objections. I have just one comment for your consideration. The distinction between the thesis and the scholarly paper is somewhat nebulous to me, with both leading to the M.S. Degree. Given the proposed schedule, it appears that students in the IUG program make the choice between those two options while still undergraduates, so I would anticipate there would need to be some fairly intensive advising providing the pros and cons of these two alternatives.

Best of luck with the initiative.

Jim

James A. Nemes, D.Sc.
Interim Chancellor
Director of Academic Affairs
From: Michelle Hill  
Sent: Monday, June 29, 2015 1:39 PM  
To: jan16@psu.edu'; 'ghs2@psu.edu'; 'cbrady@psu.edu'  
Subject: Consultation Requested by 7/13: IUG programs in IST  
Importance: High

Hello,

The College of IST is working on proposals for three new Integrated Undergraduate-Graduate (IUG) degree programs, and we’d like your input.

In case you are not familiar with this type of program, ideal candidates for IUG degree programs are students who have a strong interest in research and graduate study. This program will allow students to double-count a maximum of 12 credits towards their graduate and undergraduate degrees and obtain both degrees in five years.

The three attached proposals are for the following combined programs:

- BS in Information Sciences and Technology and MS in Information Sciences and Technology
- BA in Information Sciences and Technology and MS in Information Sciences and Technology
- BS in Security and Risk Analysis and MS in Information Sciences and Technology

Would you please review the proposals and let us know if you have any comments. The proposals have been reviewed by the Graduate School and we will be submitting them for the first Joint Curricular Committee meeting in September.

Please submit your comments to me by July 13.

Thank you,
Michelle

Michelle M. Hill  
Administrative Support Coordinator  
Graduate Programs | 321F IST Building | University Park, PA 16802  
(814)863-9455 | www.ist.psu.edu  
Grad Programs Intranet: https://intranet.ist.psu.edu/grad_prog

From: GIRISH SUBRAMANIAN [mailto:ghs2@psu.edu]  
Sent: Tuesday, July 14, 2015 1:20 PM
To: Michelle Hill <mhill@ist.psu.edu>
Subject: Re: Consultation Requested by 7/13: IUG programs in IST

I support the IUG programs.

Girish Subramanian

From: Michelle Hill
Sent: Monday, June 29, 2015 1:39 PM
To: 'jan16@psu.edu'; 'ghs2@psu.edu'; 'cbrady@psu.edu'
Subject: Consultation Requested by 7/13: IUG programs in IST
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Michelle M. Hill
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Graduate Programs | 321F IST Building | University Park, PA 16802
(814)863-9455 | www.ist.psu.edu
Grad Programs Intranet: https://intranet.ist.psu.edu/grad_prog
From: Brady, Christian M. [mailto:cmb44@psu.edu]
Sent: Wednesday, July 15, 2015 1:41 AM
To: Michelle Hill <mhill@ist.psu.edu>; 'jan16@psu.edu' <jan16@psu.edu>; ghs2@psu.edu
Cc: jxb8@psu.edu; kms28@psu.edu; Mellott, Lisa <lkk3@psu.edu>; Gutgold, Nichola <dgn2@psu.edu>
Subject: Re: Consultation Requested by 7/13: IUG programs in IST

Michelle

I am very supportive of this proposal! I will leave the content up to the experts in the field. Regarding Schreyer Scholars, you note on p. 5 (and on p. 13)

For Schreyer Honors College students, students must also follow guidelines and procedures for applying for IUG in the Schreyer Honors College:
http://www.shc.psu.edu/students/iug/program/

That is only for students wishing to do an IUG in an area that does not have an existing IUG program such as the one being set up here. Once this is set up and approved, SHC Scholars would simply go through the same process as the other students. The only note you might want to make is that for Schreyer Scholars successful completion of their Master Thesis will be accepted as completion of their honors thesis.

Just a couple of textual notes:

- P. 9 should be updated with Dean Sears’ information.
- P. 15 the graduate programs coordinator is blank (I assume the position is being filled)

--
cbrady@psu.edu

Christian M M Brady, DPhil (Oxon.)
Dean, Schreyer Honors College
The Pennsylvania State University
http://shc.psu.edu/
http://engage.shc.psu.edu/
814-865-2631

AIM: drcbrady
twitter: shcdean

"Shaping people who shape the world."™

From: Michelle Hill
Sent: Monday, June 29, 2015 1:39 PM
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Michelle M. Hill
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Grad Programs Intranet: https://intranet.ist.psu.edu/grad_prog

Appendix D. University Graduate Bulletin
(Updated material marked in bold)

Information Sciences and Technology (IST)

Program Home Page

ANDREW SEARS, Dean, College of Information Sciences and Technology
MARY BETH ROSSON, Associate Dean for Graduate and Undergraduate Studies

Office of the Dean
College of Information Sciences and Technology
The Pennsylvania State University
332 Information Sciences and Technology Building
University Park, PA 16802-6823
Dean's office: 814-865-3528; Graduate office: 814-865-8711
Degrees Conferred

Ph.D., M.S., M.P.S. in Information Sciences
Integrated B.A. in Information Sciences and Technology and M.S. in Information Sciences and Technology
Integrated B.S. in Information Sciences and Technology and M.S. in Information Sciences and Technology
Integrated B.S. in Security and Risk Analysis and M.S. in Information Sciences and Technology

The Graduate Faculty

- John W. Bagby, J.D. (UNIVERSITY OF TULSA), Professor of Information Sciences and Technology
- Guoray Cai, Ph.D. (UNIVERSITY OF PITTSBURGH), Associate Professor of Information Sciences and Technology, Geography, and Computer Science and Engineering
- Brian H Cameron, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Associate Dean for Professional Master’s Programs, Clinical Professor of Management Information Systems, Smeal College of Business; Affiliate Faculty of Information Sciences and Technology
- John Carroll, Ph.D. (COLUMBIA UNIVERSITY), Distinguished Professor of Information Sciences and Technology
- Eun Kyoun Choe, Ph.D. (UNIVERSITY OF WASHINGTON), Assistant Professor of Information Sciences and Technology
- Chao-Hsien Chu, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Professor of Information Sciences and Technology; Affiliate Professor of Management Science and Information Systems
- Shawn Clark, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Senior Lecturer in Information Sciences and Technology
- Frederico T. Fonseca, Ph.D. (UNIVERSITY OF MAINE AT ORONO), Associate Professor of Information Sciences and Technology; Affiliate Assistant Professor of Geography
- Peter K. Forster, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Associate Dean for Online Programs and Professional Education; Senior Lecturer in Information Sciences and Technology
- C. Lee Giles, Ph.D. (UNIVERSITY OF ARIZONA), Interim Associate Dean for Research; David Reese Professor of Information Sciences and Technology; Professor of Computer Science and Engineering
- Edward J. Glantz, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Senior Lecturer in Information Sciences and Technology
- Jacob L. Graham, M.A. (UNIVERSITY OF OKLAHOMA), Professor of Practice in Security and Risk Analysis
- Jens Grossklags, Ph.D. (UNIVERSITY OF CALIFORNIA BERKELEY), Assistant Professor of Information Sciences and Technology
- David L. Hall, Ph.D. (PENNSYLVANIA STATE UNIVERSITY), Professor of Information Sciences and Technology, and Electrical Engineering
- John T. Harwood, Ph.D. (UNIVERSITY OF NEBRASKA, LINCOLN), Associate Vice Provost for Information Technology; Associate Professor of Information Sciences and Technology; Associate Professor of English
- Steven R. Haynes, Ph.D. (LONDON SCHOOL OF ECONOMICS), Senior Lecturer in Information Sciences and Technology
- Vasant Honavar, Ph.D. (UNIVERSITY OF WISCONSIN-MADISON), Professor and Edward Frymoyer Chair of Information Sciences and Technology and Bioinformatics and Genomics; Affiliate Professor of Huck Institutes of the Life Sciences
- Bernard James Jansen, Ph.D. (TEXAS A & M UNIVERSITY), Professor of Information Sciences and Technology
- Lynette Kvasny, Ph.D. (GEORGIA STATE UNIVERSITY), Associate Professor of Information Sciences and Technology
- Dongwon Lee, Ph.D. (UNIVERSITY OF CALIFORNIA LOS ANGELES), Associate Professor of Information Sciences and Technology; Computer Science and Engineering
- Zhenhui (Jessie) Li, Ph.D. (UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN), Assistant Professor of Information Sciences and Technology
- Peng Liu, Ph.D. (GEORGE MASON UNIVERSITY), Professor of Information Sciences and Technology; Computer Science and Engineering
- Alan M. MacEachren, Ph.D. (UNIVERSITY OF KANSAS), Professor of Geography; Affiliate Faculty of Information Sciences and Technology
- Carleen Maitland, Ph.D. (DELT UNIVERSITY OF TECHNOLOGY), Associate Professor of Information Sciences and Technology
- Michael D. McNeese, Ph.D. (VANDERBILT UNIVERSITY), Professor of Information Sciences and Technology and Psychology
- Scarlett H. Miller, Ph.D. (UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN), Assistant Professor of SEDTAPP and Industrial Engineering; Affiliate Faculty of Information Sciences and Technology
- Prasenjit Mitra, Ph.D. (STANFORD UNIVERSITY), Professor of Information Sciences and Technology, and Computer Science and Engineering
The Doctor of Philosophy degree in Information Sciences and Technology offers advanced graduate education for students contemplating careers in academic teaching and research, or research in a non-academic setting. The program is interdisciplinary in nature and expects scholarship at the highest level exhibiting depth of competency in at least one of the core areas of the Information Sciences and Technology and an understanding of the integration of the critical constructs that drive the field: people, information, and technology.
The Master of Science in Information Sciences and Technology is an interdisciplinary degree program that focuses on the theoretical, application-oriented, and educational issues facing a digital, global economy. The program is designed to build an understanding of how information and technology fundamentally impact (and are impacted by) people, organizations, and the world community. Topical areas within IST span a broad range including: human computer interaction, computational techniques, applications (e.g., bio-informatics and geographical information systems), societal issues (such as digital divide issues), user issues (e.g., computer-aided cognition), and information systems design and development providing exposure and grounding in many of the aspects of the information sciences. The program is especially attractive to students interested in gaining state-of-the-art understanding of information technology and its use as a solution in multiple venues.

The Master of Professional Studies in Information Sciences (MPS-IS) is an innovative program that targets professionals and organizational leaders who wish to seek a professional education and training program. The purpose of the professional master’s program is to produce professionals and organizational leaders who not only can select and draw upon the necessary foundations within the information sciences and information technology areas, test the applicability of these foundations for addressing a given issue, and apply resulted solutions, but also can be aware of the multitude of technological trends and environmental factors that organizations must address in the changing global economy.

The MPS-IS equips students to be able to:

1. Understand and analyze the profound information and technological changes sweeping the world;
2. Meet the challenges by developing innovative solutions using the foundations of information sciences and technology; and
3. Have a clear advantage in today’s highly competitive and dynamic environment by continuously learning new trends, issues, and innovations.

Admission Requirements

Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor’s degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Applicants to the Professional Master Program are required to submit scores from the general portions of the Graduate Record Examinations (GRE) or the Graduate Management Admissions Test (GMAT), three letters of reference, and a one-three page personal statement of relevant experience and goals. The GRE or GMAT requirement may be waived for applicants to the Professional Master’s Program if the student has five or more years of relevant information sciences and technology working experience. Applicants to the Ph.D. and M.S. programs are required to submit scores from the general portions of the Graduate Record Examinations (GRE), three letters of reference, a current resume (to include present position and any publications), one-three page statement of research background and goals related to pursuing an advanced degree and career in IST, which also briefly discusses your personal motivation for obtaining a Ph.D. or M.S., and a sample of the applicant’s writing (e.g., technical paper, etc.).
Because the program is multidisciplinary in nature, students from many different disciplines may be accepted for entry into the program. A bachelor’s degree in a related area (e.g., engineering and science), while not necessary for admission, is helpful in the successful completion of the degree. It is expected that students will have a basic level of competency in statistics, as well as computer and information technology. Related work experience can be used to demonstrate such competency. A student may be accepted into the program with provisional status for no more than one year while work is completed to meet these expectations.

It is expected that the successful applicant will have an overall grade point average of 3.00 (on a 4.00 scale) or higher for his or her undergraduate study (and/or graduate-level study). However, accomplishments demonstrated through work experience and recommendation letters from the applicant’s academic adviser or employer will also play an important role in making the admission decision. The most qualified applicants will be accepted into the program until all spaces for new students are filled.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 22 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Degree Requirements

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

The doctoral degree requirements include the general requirements of the Graduate Council as listed under the Doctoral Degree Requirements. To complete a Ph.D. degree, students must in their first semester take the 6-credit introduction to interdisciplinary research methods (IST 501), one of the three foundations courses (IST 510, IST 520, IST 530), and one credit of graduate colloquium (IST 590). In their second semester, students must take the remaining two foundations courses and a second credit of graduate colloquium.

In addition to these first-year requirements, doctoral students must complete 12 credits of research methodology courses selected to introduce or amplify methods relevant to their doctoral research agenda, and 12 credits of specialization courses, also selected to reinforce their research training.
In addition, all candidates must be competent in the English language and must have demonstrated skills in the communication of ideas both verbally and in writing commensurate with the requirement of scholarly and professional work. The candidacy examination will be used as an occasion to assess English proficiency and plan for remediation (including additional courses, mentoring, or experiences) for all students. A brief critical literature review in three complementary research areas will be included as part of the candidacy assessment process. The foreign language and communication requirement may be fulfilled through demonstrating computer language proficiency (assessed through courses taken) or a minimum of 9 credits of 500-level statistics courses. Students must have completed 18 graduate credits before taking the candidacy exam and must complete the candidacy exam within three semesters. Students must pass the Ph.D. comprehensive examination after completion of most of the course work, usually at the end of the student's second year in the program. A research-based dissertation must be completed under the direction of the Ph.D. committee, with the student submitting a dissertation proposal and defending that proposal in the defense examination.

General guidance of a doctoral candidate is the responsibility of a doctoral committee consisting of four or more active members of the Graduate Faculty, which includes at least two faculty members in the major field. The dissertation adviser must be a member of the doctoral committee. The dissertation adviser usually serves as chair, but this is not required. If the candidate is also pursuing a dual-title field of study, a co-chair representing the dual-title field must be appointed.

At least one regular member of the doctoral committee must represent a field outside the candidate’s major field of study in order to provide a broader range of disciplinary perspectives and expertise. This committee member is referred to as the "Outside Field Member." In cases where the candidate is also pursuing a dual-title field of study, the dual-title representative to the committee may serve as the Outside Field Member.

Additionally, in order to avoid potential conflicts of interest, the primary appointment of at least one regular member of the doctoral committee must be in an administrative unit that is outside the unit in which the dissertation adviser’s primary appointment is held (i.e., the adviser’s administrative home; in the case of tenure-line faculty, this is the individual’s tenure home). This committee member is referred to as the "Outside Unit Member." In the case of co-advisers, the Outside Unit Member must be from outside the administrative home(s) of both co-advisers. In some cases, an individual may have a primary appointment outside the administrative home of the student’s dissertation adviser and also represent a field outside the student’s major field of study; in such cases, the same individual may serve as both the Outside Field Member and the Outside Unit Member.

M.S. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

The M.S. in Information Sciences and Technology requires a minimum of 30 credits at the 400 level or above, with at least 18 credits at the 500 or 600 level or above. 27 of the 30 credits must be earned at University Park. A minimum of 12 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major program, with a minimum number of 800-level credits as appropriate to the degree and as approved by the graduate program to be applied to degree requirements. These 30 credits are distributed among the following requirements:
The M.S. in Information Sciences and Technology requires a minimum of 30 credits at the 400 level or above, with at least 18 credits at the 500 level or above; 27 of the 30 credits must be earned at University Park. These credits are distributed among the following requirements:

Core Courses (6 credits). All candidates are expected to develop a broad understanding of the core constructs of people, information, technology, and the significant interactions among those elements by taking IST 504 and IST 505.

Specialization Courses (12 credits). In consultation with his/her adviser, a candidate is expected to choose courses in one or more areas customized to support the thesis or scholarly paper requirement. In addition to advanced courses in IST, a support area could be in law, business, education, engineering, the liberal arts, science, or any area that is linked to the information sciences.

Research Methods (6 credits). All candidates must develop a basic understanding of the research methods utilized in the information sciences, by taking at least two research methods courses offered in IST or elsewhere. The focus of the course must be on the methods being learned rather than application of some method to a research topic.

Thesis or Scholarly paper (6 credits). Students may choose a thesis or scholarly paper option. Students who choose the thesis option must register for 6 credits of IST 600, write a satisfactory thesis accepted by the master’s committee, the head of the graduate program, and the Graduate School, and pass a thesis defense, write a thesis, orally defend the thesis to the thesis committee, and register for 6 credits of IST 600. The thesis should focus on a well-defined problem relevant to the information sciences. Students who choose the scholarly paper option must register for 6 credits of IST 594 and complete a scholarly paper, and register for 6 credits of IST 594. The scholarly paper is to be a focused piece of technical work that applies the student’s expertise and knowledge base, and that is documented and presented as a scholarly paper. Students who choose the scholarly paper option must write a scholarly paper and submit that is accepted by their M.S. committee. An oral presentation is at the discretion of the student’s adviser.

Language and Communication. All candidates must be competent in the English language and must have demonstrated skills in the communication of ideas both orally and in writing commensurate with the requirement of professional work. The foreign language and communication requirement may be fulfilled through demonstrating computer language proficiency (assessed through courses taken).

IUG Degree Requirements

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor’s and master’s degree in a shorter period of time than would be necessary if the degrees were pursued separately. There are three approved IUG programs: an Integrated B.A. in Information Sciences and Technology and M.S. in Information Sciences and Technology, an Integrated B.S. in Information Sciences and Technology and M.S. in Information Sciences and Technology, and an Integrated B.S. in Security and Risk Analysis and M.S. in Information Sciences and Technology.

The first two to three years of undergraduate coursework follow the same undergraduate curriculum that other students follow in the Information Sciences and Technology major. Information Sciences and Technology undergraduates may apply for admission to the IUG
program as early as the end of their sophomore year but no later than the end of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in a College of IST undergraduate degree program.
2. Must have completed 60 credits of an IST undergraduate degree program.
3. Must apply to the IUG program by the end of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST. Students must complete the Graduate School application.
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members. (Note: For Schreyer Honors College students, these can be the same two letters required by the Schreyer Honors College.)
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

If admitted to the IUG, the final years of study include graduate courses—IST 504 (fall), and IST 505 (spring), plus two semesters of graduate research, six credits of research methods courses, and twelve credits of specialty courses. To earn the M.S. degree, students in the IUG program must complete all of the degree requirements for the M.S. degree, described above. If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

For Schreyer Honors College students, students should follow guidelines and procedures for applying for an IUG in the Schreyer Honors College guidelines and procedures for applying for an IUG in the Schreyer Honors College:

http://www.shc.psu.edu/students/iug/program/

Students admitted to the IUG program may double-count a maximum of 12 credits to their graduate and undergraduate degrees in Information Sciences and Technology. The required 6 credits of IST 504 and IST 505 will apply to both the graduate program and the undergraduate program. Students may choose an additional 6 credits to double-count for both the undergraduate and graduate degrees from the following: SRA 433, SRA 468, SRA 471, IST 451, IST 452, IST 454, IST 456.

Double-counted credits must be at the 400-level or higher. No more than 6 credits may be at the 400-level. Credits associated with the thesis or culminating scholarly paper, i.e., IST 600 and IST 594, respectively, may not be double-counted. However, for Schreyer Honors College students, the Master’s thesis deliverable, itself, may double-count for the undergraduate thesis deliverable requirement. For specific course requirements, refer to the IUG M.S. Handbook.

M.P.S. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.
The MPS-IS program requires a minimum of 33 credits, 24 of which must be earned at Penn State. At least 18 credits must be courses at the 500 level and above. A maximum of 9 transfer credits of high-quality graduate work may be applied toward the requirements for the degree, subject to restrictions outlined in the Transfer Courses section of the Graduate Bulletin. A student can choose to be in the Base Program or in the Cybersecurity and Information Assurance (CIA) Option. The 33 credits are distributed among the following requirements. A student first takes 9 credits of core courses. The student then takes 12 credits of prescribed courses for either the base program or the Cybersecurity and Information Assurance Option. An additional 9 credits are elective courses. Lastly, the student must complete a master’s project guided by the student’s adviser and completed while enrolled in IST 594.

The MPS-IS program requires a minimum of 33 credits, 24 of which must be earned at Penn State. Up to 9 graduate credits may be transferred in from a regionally accredited institution (as is permissible by the Graduate School). At least 18 credits must be courses at the 500 level and above. A student will first take 9 credits of core courses. The student will then take 12 credits of prescribed courses for the base program or the Cybersecurity and Information Assurance Option. An additional 9 credits are elective courses. Lastly, the student must complete a master project guided by the student’s adviser. A student can choose to be in the Base Program or in the Cybersecurity and Information Assurance (CIA) Option. These credits are distributed among the following requirements and reflected by completion of 3 credits of IST 594.

Core Courses (9 credits). The core of the MPS-IS consists of three courses -- IST 852 or INFSY 540, IST 554, and IST 816. These courses represent the core technical foundations to study Information Sciences and Technology.

The Base Program (12 credits of prescribed courses and 9 credits of electives). The base program consists of four prescribed (required) courses - IST 815, IST 521 (or IST 522), IST 532 (or IST 531), and IST 564 – and 9 credits of elective courses, in addition to the 9-credit core and 3-credit capstone course. It is designed for students who do not have a special interest in mind. The elective courses are chosen in consultation with the student’s adviser. Hence, it offers the flexibility that enables the student to build an in-depth knowledge and skills about information sciences tailored to his/her interests and background. Students from the Harrisburg region can also select courses from Penn State Harrisburg to fulfill the prescribed courses (by substitution) and 9 credits of electives.

Cybersecurity and Information Assurance (CIA) Option (12 credits of prescribed courses and 9 credits of electives). The CIA option consists of four prescribed (required) courses, IST 815, IST 555, IST 456, and IST 885, and 9 credits of elective courses selected from IST 451, 454, 564, or IN SC 561, or other courses from a list of approved electives that is maintained by the head of the graduate program and is available from the program office, in addition to the 9-credit core and 3-credit capstone courses. These courses enable the student to focus on developing knowledge and skills for information analysis, information assurance, and decision support, including theories, techniques, and applications of data mining, data fusion, information search, information security, and intelligent resource allocation.

Master Project (3 credits). The project requires all students in the MPS-IS to focus on a well-defined issue or problem relevant to the information sciences and technology. The student will submit a project proposal to his/her faculty adviser for approval. Upon completion of the project, the student will share or present the project results at a final presentation as a component of IST 594.

Language and Communication. All candidates must be competent in the English language and must have demonstrated skills in the communication of ideas both orally and in writing commensurate with the requirement of professional work. The foreign language and communication requirement may be fulfilled through demonstrating computer language proficiency (assessed through courses taken).
Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

INFORMATION SCIENCES AND TECHNOLOGY (IST) course list