WASHINGTON STATE UNIVERSITY
MAJOR CURRICULAR CHANGE FORM - NEW/RESTORE COURSE

☐ Please attach rationale for your request, a complete syllabus, and explain how this impacts other units in Pullman and other campuses (if applicable).
☐ Obtain all required signatures with dates.
☐ Provide original stapled packet of signed form/rationale statement/syllabus PLUS 10 stapled copies of complete packet to the Registrar's Office, campus mail code 1035.
☐ Submit one electronic copy of complete packet to wsu.curriculum@wsu.edu.

Requested **Future** Effective Date: **Spring 2017** (term/year) Course Typically Offered: **Spring every other year**

DEADLINES: For fall term effective date: **October 1st**; for spring or summer term effective date: **February 1st**. See instructions.
NOTE: Items received after deadlines may be put to the back of the line or forwarded to the following year. Please submit on time.

<table>
<thead>
<tr>
<th>☐ New Course</th>
<th>☐ Temporary Course</th>
<th>☐ Restore Course</th>
</tr>
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<table>
<thead>
<tr>
<th>course subject/crosslist</th>
<th>course no.</th>
<th>title</th>
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</table>
| ED PSYCH 576 | 576 | Factor Analytic Procedures
| (3) | | ED PSYCH 565; suggested ED PSYCH 569 |

<table>
<thead>
<tr>
<th>Credit hrs</th>
<th>lecture hrs</th>
<th>lab or studio</th>
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<tbody>
<tr>
<td>per week</td>
<td>hrs per week</td>
<td></td>
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</tbody>
</table>

3 | 3 |

**Description for catalog:** The course provides an introduction to factor analytic techniques and examines the use of factor analysis in the social sciences.

**Additional Attributes:** Check all that apply.

- ☐ Crosslisting (between WSU departments)*
- ☐ Variable credit: __________
- ☐ Conjoint listing (400/500):
- ☐ Repeat credit (cum. max. hrs):
- Special Grading: ☐ S, F; ☐ A, S, F (PEACT only); ☐ S, M, F (VET MED only); ☐ H, S, F (PHARMACY, PHARDSCI only)
- ☐ Cooperative with UI
- ☐ Other (please list request):

The following items require prior submission to other committees/depts. (SEE INSTRUCTIONS.)

- ☐ Request to meet Writing in the Major [M] requirement (Must have All-University Writing Committee Approval.)
- ☐ Request to meet UCORE in __________ (Must have UCORE Committee Approval) ›› See instructions.
- ☐ Special Course Fee __________ (Must submit request to University Receivables.)

**Contact:** Brian French/Lynn Buckley  Phone number: 335-8584  Campus mail code: 2136
Email: frenchb@wsu.edu/buckleyl@wsu.edu  Instructor, if different:

**Chair/date**  3-3-15  **Dean/date**  **All-University Writing Com / date**

**Chair (if crosslisted/interdisciplinary)**  **Dean (if crosslisted/interdisciplinary)**  **UCORE Committee Approval Date**

**Catalog Subcommittee Approval Date**  **GSC or AAC Approval Date**  **Faculty Senate Approval Date**

*If the proposed change impacts or involves collaboration with other units, use the additional signature lines provided for each impacted unit and college.
New Course Description and Rationale:

ED PSYCH 576: Factor Analytic Procedures

Description (20 words or less):

This introduction to factor analysis covers the understanding of the components of factor analysis, applications, and examination of methodological issues.

Rationale:

The advanced doctoral topic titled *Factor Analytic Procedures* is being taught for the third time this Spring semester since 2008 as an advanced doctoral seminar under a special topics course. The course is offered every other year. Students enroll in the course from various areas around campus. The demand for the course across campus is evident by the enrollment (e.g., 18 students in Spring 2015, capped at 15). The course adds to a series of other Educational Psychology courses focused on educational and psychological measurement, statistics, and research methodology.

This doctoral level course provides students with the technical foundation and computer software training necessary to conduct factor analytic work (e.g., developing instruments, examination of measurement invariance) in their area. For doctoral students to gain a significant background in these techniques and to appropriately conduct such analyses continues to be difficult, as some graduate schools do not offer a semester long course on the topic (Gorsuch, 1983). Often factor analysis is covered only in two weeks in other courses (e.g., multivariate statistics). This is obviously insufficient to properly train students to conduct factor analytic work as seen in reviews of the improper use of the techniques in the social sciences, an issue amplified by the fact that factor analysis is used in 18% to 27% of the articles in typical social science journals (Fabrigar, MacCallum, Wegener, & Strahan, 1999) and certainly has risen in popularity in the past 15 years. In fact, it is used as a major piece of evidence in building validity arguments as cited in the *Standards for Educational and Psychology Testing* (AERA, APA, & NCME, 2015). Furthermore, factor analysis is at the foundation of the measurement of psychological and educational constructs and latent variables (Thompson & Daniel, 1996). Doctoral students need to be properly trained to be quality consumers and producers of factor analytic research. This course is focused on providing such training. Moreover, it aligns with WSU strategic goals by providing a premier education and transformative experience that prepares students to excel in a global society.

This course is not expected to impact other units with the college or across campuses.
EDPSY 576--Factor Analytic Procedures
Spring, Monday 1:10-4:00pm, Ed Ad 216

Instructor: Brian French, Ph.D.
Office: Cleveland 362
Office Hours: Tuesday 9-10am or by appointment
Telephone: 335-8584
Email address: frenchb@wsu.edu
Web:

Prerequisites:
Previous coursework covering regression and knowledge of multivariate statistics. Basic data analysis experience is assumed. Courses: Ed PSYCH 565; suggested Ed PSYCH 569.

Purpose:
The course will provide a general introduction to exploratory and confirmatory factor analysis techniques and examine the use of factor analysis in the social sciences. The course focuses on (a) understanding the basic components of factor analysis, (b) practical applications, and (c) in-depth examination of methodological issues. Emphasis will be placed on the application of the methods. In the course, the student will (a) develop skills to conduct factor analytic research and (b) critically review the use of factor analysis in research.

Learning Outcomes:

Learning Outcomes of the course are to enable the student to:
1. Learn key concepts underlying factor analysis, as demonstrated through homework assignments.
2. Understand research studies using factor analysis, as demonstrated through homework assignments.
3. Become familiar with using software for factor analysis, as demonstrated through homework assignments and the course project.
4. Conduct exploratory and confirmatory factor analyses, as demonstrated through homework assignments and the course project.
5. Present results, as well as interpret and discuss the findings, as demonstrated through homework assignments and class presentation.
6. Be familiar with topics such as multigroup and longitudinal analyses, latent growth modeling, as demonstrated through discussion in class and homework assignments.

Texts and Readings
There are two (2) required texts and primary readings as well as several recommended books. The student is encouraged to consult the additional texts for further discussions of issues. Readings may be added or deleted as necessary. Some texts may be available in the lab for projects. We will also read several journal articles both in application and in methodology development.

Required

Suggested
Software:
Computer lab work is a component of the course. This will give the student the opportunity to apply what is discussed in class. Students will be exposed to SAS and LISREL. Other software may be introduced as time allows or need arises. SAS is available in the university computer labs. A student version of LISREL can be downloaded for free to use on your personal computer (http://www.ssicentral.com). LISREL and SAS will be available in the lab.

Grades:
Grades will be based on (a) participation in class discussions (20%), (b) in-class presentations (20%), (c) homework assignments (20%), and (d) final project (40%). Attendance is expected. Please notify the instructor in advance if you are unable to attend class. You are responsible for the material covered during any class you miss. You are encouraged to work together and assist each other with the course material and assignments. However, all assignments should be your own work. Academic honesty is expected. Please note that grading in Table 1 is only in whole numbers. Standard rounding rules apply.

Course Grading Standards:
Table 1

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percent</th>
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<tbody>
<tr>
<td>A</td>
<td>100 - 93%</td>
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<tr>
<td>A-</td>
<td>92 - 90%</td>
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<tr>
<td>B+</td>
<td>89 - 87%</td>
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<tr>
<td>B</td>
<td>86 - 83%</td>
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<tr>
<td>B-</td>
<td>82 - 80%</td>
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<tr>
<td>C+</td>
<td>79 - 77%</td>
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<tr>
<td>C</td>
<td>76 - 73%</td>
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<tr>
<td>C-</td>
<td>72 - 70%</td>
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<tr>
<td>D+</td>
<td>69 - 67%</td>
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<tr>
<td>D</td>
<td>66 - 60%</td>
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<tr>
<td>F</td>
<td>59% or below</td>
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</table>

Assignments:
There will be no fewer than five homework assignments during the semester. These are in addition to the assignments note on the schedule now. The data and further information will be provided regarding these assignments throughout the semester. Data and sample code files will be available.

Participation:
As this is a doctoral seminar, students are expected to actively participate in class. This means you should ask questions, raise points discussed in the articles and chapters, and come to class prepared to assist with the learning of the material. Expect to spend time in class working to understand information from the readings as well as conducting analysis. I understand that learning the software and analysis can be frustrating but the long term reward is worth it!

Presentations:
Each student will give two presentations throughout the semester. One presentation will be of an empirical article the student selects to critically review for its use of factor analysis. These will start on 2/23. Please give a paper copy or a PDF copy of the article to me one week prior to your presentation. I will make these papers available for the class to read. An outline for what you should cover is posted on the course website. Your presentation should take no more than 15 minutes.

The second presentation will involve presenting your final project. More details will be given in class. This presentation will be similar to giving a conference talk. The length will be approximately 15 minutes with 5 minutes for questions.

Final Project:
This is an opportunity to demonstrate what you have learned throughout the semester. The project involves conducting a factor analytic study on data that are of interest to you. The dataset can be obtained from one of your professors, colleagues, or one that you have collected. A methodological study (i.e., simulation study) of an aspect of factor
analysis also is acceptable. If you have questions about a data source, please ask. I can also generate data for you but need sufficient time to do so (i.e., 3-4 weeks). Projects will be presented to the class at the end of the semester. This is one of your presentations. The written report is due on 4/27.

The project report must be typed and follow APA format (6th edition). The APA style manual is available at the bookstore and in the reference section of the library. Font size should be no smaller than 10 or larger than 12 point. Page margins should be 1.0 inch. The paper should be written in a form suitable for publication or submission for a conference paper in your area with a limit of 3500 words, excluding references, tables, and figures. I will have examples posted on Angel. Computer programs and sample output from the analysis must be provided with the paper. More details will be given in class. Please proof read your work carefully. Incorrect grammar, misspelled words, and not following APA format are unacceptable. Projects given to me after the due date will not be eligible for credit toward your final grade.

Mobile Phones/Beepers/PDAs/Computers
Any student carrying a mobile phone/beeper or other PDA should turn it off or set it to vibrate during class. In the event that a student must remain “on-call” during class, they should plan to sit where they can easily leave the room without disturbing others. Also, please refrain from sending text messages or participating in other social media outlets (e.g., Facebook) while in class. If you cannot refrain from such activities you will be asked to leave the classroom.

Academic Integrity
Academic integrity is the cornerstone of the university. Any student who attempts to gain an unfair advantage over other students by cheating, will fail the assignment and be reported to the Office Student Standards and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). Attention to this policy is particularly important in a course like EDPSY/EDRES 565, in which collaboration with other students is encouraged. If, for example, you work closely with other students during the planning, execution, or interpretation of your data analyses – a process that I support – you should make sure that the other students’ contributions are recognized explicitly in your written account. Academic dishonesty is not tolerated and will result in action (i.e., failing the assignment and/or course depending on the nature of the offense) in accord with the policy. Please contact me if you have questions with this issue.

Disability Accommodations
Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center. For more information contact a Disability Specialist on your home campus:
Pullman or WSU Online: 509-335-3417 http://accesscenter.wsu.edu, Access.Center@wsu.edu

Emergency Notification System
Washington State University is committed to enhancing the safety of the students, faculty, staff, and visitors. It is highly recommended that you review the Campus Safety Plan (http://safetyplan.wsu.edu/) and visit the Office of Emergency Management web site (http://oem.wsu.edu/) for a comprehensive listing of university policies, procedures, statistics, and information related to campus safety, emergency management, and the health and welfare of the campus community.
<table>
<thead>
<tr>
<th>Week</th>
<th>TOPIC</th>
<th>ASSIGNMENT DUE/READINGS</th>
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<tbody>
<tr>
<td>1</td>
<td>Course Overview</td>
<td>Discuss HW1 for next week and format throughout the semester</td>
</tr>
<tr>
<td>2</td>
<td>Factor analysis in Research,</td>
<td>Comrey &amp; Lee, p.1-14; Floyd &amp; Widaman, 1995;</td>
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<tr>
<td>3</td>
<td>Assumptions and data</td>
<td>Kieffer, 1999; Fabrigar &amp; Wegner, Ch 1 &amp; 2</td>
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<td>4</td>
<td>Factor models</td>
<td>Gorsuch, Ch 2, 8*; MacCallum et al., 1999; Fabrigar &amp; Wegner, Ch 3 &amp; 4;</td>
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<td>5</td>
<td>Sample size, Power, Extraction methods and # of factors</td>
<td>Velicer &amp; Jackson, 1990; Widaman, 1993; Zwick &amp; Velicer, 1986; Wegner, Ch 3 &amp; 4;</td>
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<tr>
<td>6</td>
<td>Rotation methods and factor scores</td>
<td>Fabrigar &amp; Wegner Ch 5, 6; Gorsuch Ch 9* &amp; 18*;</td>
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<td>7</td>
<td>Critical evaluation of factor analytic use/reporting results</td>
<td>Comrey, 1978; Comrey, 1988; Fabrigar et al., 1999; Reise et al., 2000; Benson &amp; Nasser, 1988</td>
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<tr>
<td>8</td>
<td>Intro to CFA and model, specification, Sample size</td>
<td>Byrne, 1998 Ch 1; Brown, Ch 1, 4,10; Crowley &amp; Fan, 1997; Long, 1983, pgs 11-34, Hancock &amp; French, 2013 <strong>DUE: OUTLINE for PROJECT including references</strong></td>
</tr>
<tr>
<td>11</td>
<td>Higher order models, bi-factor, ESEM.</td>
<td>Brown, Ch 8; Marsh, 1987; Kranzler &amp; Keith, 1999</td>
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<tr>
<td>12</td>
<td>Item parcel use, Multilevel FA</td>
<td>Reise et al., 2005; Reise, 2012; Marsh et al., 2013</td>
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<td>13</td>
<td>Method and measurement bias Multiple group analyses; latent mean structures analysis</td>
<td>Brown Ch 6, 7; Byrne, Ch 6; Byrne et al., 1989; Maller &amp; French, 2004; Cole et al., 1993;</td>
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<tr>
<td>14</td>
<td>Growth Models</td>
<td>Hancock et al, 2013</td>
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<td>15</td>
<td>Cautions &amp; issues</td>
<td>Bentler &amp; Chou, 1987; Graham et al.,2003 <strong>DUE: Final Project Written Report</strong></td>
</tr>
<tr>
<td>16</td>
<td>Project Presentations-as final</td>
<td>Project Presentations-as final</td>
</tr>
</tbody>
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