Course Information

Date Submitted: 10/15/2014

Current Prefix and Number: EPE - Edc. Policy Studies &Eval. , EPE 660 RSRCH DESIGN &ANALYSIS IN EDUCATION

Other Course:

Proposed Prefix and Number: EDP/EPE 660

What type of change is being proposed?

> Major – Add Distance Learning

Should this course be a UK Core Course? No

1. General Information

a. Submitted by the College of: EDUCATION

b. Department/Division: Educational Policy Studies and Evaluatio

c. Is there a change in 'ownership' of the course? No

   If YES, what college/department will offer the course instead:

e. Contact Person

> Name: Hongwei Yang
>
> Email: hya222@uky.edu
>
> Phone: 8592572330

> Responsible Faculty ID (if different from Contact)
>
> Name: Hongwei Yang
>
> Email: hya222@uky.edu
>
> Phone: 8592572330

f. Requested Effective Date

   Semester Following Approval: No OR Effective Semester: Spring 2015

2. Designation and Description of Proposed Course

a. Current Distance Learning (DL) Status: Please Add

b. Full Title: RESEARCH DESIGN AND ANALYSIS IN EDUCATION

   Proposed Title: RESEARCH DESIGN AND ANALYSIS IN EDUCATION

c. Current Transcript Title: RSRCH DESIGN &ANALYSIS IN EDUCATION

   Proposed Transcript Title: RSRCH DESIGN &ANALYSIS IN EDUCATION

d. Current Cross-listing: Same as: EDP 660

Proposed – ADD Cross-listing :

Proposed – REMOVE Cross-listing:

e. Current Meeting Patterns

LECTURE: 3

Proposed Meeting Patterns

LECTURE: 3

f. Current Grading System: Graduate School Grade Scale

Proposed Grading System: *Graduate School Grade Scale*

g. Current number of credit hours: 3

Proposed number of credit hours: 3

h. Currently, is this course repeatable for additional credit?   No

Proposed to be repeatable for additional credit?   No

If Yes: Maximum number of credit hours: NA

If Yes: Will this course allow multiple registrations during the same semester?   No

2i. Current Course Description for Bulletin: This is a statistics-oriented course that focuses on various aspects of a regression analysis. Topics to be covered include, but are not limited to, simple correlation and regression, multiple regression (with and without interaction terms), regression diagnostics, logistic regression, etc. The course aims to familiarize students with cleaning data for regression analysis, building regression models, selecting the optimal regression analysis, building regression models, selecting the optimal regression model for the data in hand, gain requisite foundation knowledge necessary to learn more complex statistical tests and procedures, and become more critical of statistical presentations in academic journals and the mass media.

   Proposed Course Description for Bulletin: This is a statistics-oriented course that focuses on various aspects of regression analysis (general and generalized linear models). Topics to be covered include, but are not limited to, simple correlation and regression, multiple regression (with and without interaction/moderation terms, with/without nonlinear terms, contrast variable coding for categorical predictors, nested model comparison for hierarchical regression, etc.), regression diagnostics (outlying and influential cases identification and assessment, collinearity evaluation, residual analysis, etc.), logistic regression (with a comparison of the logit model with other commonly used classification models like probit model, decision tree model, etc.), among other things. The course will familiarize students with cleaning data for regression analysis, building regression models, conducting statistical inference of regression models, selecting the optimal regression model(s) for the data in hand, and interpreting regression analysis results using the right language. Students will gain requisite foundation knowledge necessary to learn more complex statistical tests and procedures, and become more critical of statistical presentations in academic journals and the mass media. Students will also become proficient in using at least one major statistics computer program (SPSS, Minitab, SAS, Stata, or R).

2j. Current Prerequisites, if any: Prereq: EPE/EDP 558 or consent of instructor

   Proposed Prerequisites, if any: Prereq: EDP/EPE 558 or consent of instructor

2k. Current Supplementary Teaching Component:

   Proposed Supplementary Teaching Component: No Change

3. Currently, is this course taught off campus?   No

   Proposed to be taught off campus?   Yes

   If YES, enter the off campus address: Online via Blackboard at elearning.uky.edu

4. Are significant changes in content/student learning outcomes of the course being proposed?   No

   If YES, explain and offer brief rational: NA

5a. Are there other depts. and/or pgms that could be affected by the proposed change?   Yes

   If YES, identify the depts. and/or pgms: This course is taken by students from all departments in the College of Education. Students from other colleges on campus often take it as an elective, but to our knowledge is not required.

5b. Will modifying this course result in a new requirement of ANY program?   No

   If YES, list the program(s) here: NA

6. Check box if changed to 400G or 500:   No

Distance Learning Form

Instructor Name: Hongwei Yang

Instructor Email: hya222@uky.edu

Internet/Web-based: Yes

Interactive Video: No

Hybrid: No

1.How does this course provide for timely and appropriate interaction between students and faculty and among students? Does the course syllabus conform to University Senate Syllabus Guidelines, specifically the Distance Learning Considerations?   EDP/EPE 660 - RSRCH DESIGN &ANALYSIS IN EDUCATION (see attached syllabus) conforms to all University of Kentucky Distance Learning Syllabus Guidelines and specifically includes information about virtual office hours, procedures for resolving technical issues, notification and information about self-disclosure and procedures for disability accommodations etc. Web-based course delivery methods will be used for 100% of individual student engagement and course interactions. Web based assessments described in the syllabus include: (1) Asynchronous Dialogue: Students are required to actively interact with their class peers on the Blackboard-based discussion board forum; (2) Participation: Students are required to complete independent work as presented on the course calendar and submit blackboard practice activities online; (3) Comprehensive homework assignments and end-of-semester project: Students will receive homework assignments electronically through Blackbord and submit completed homework back to the instructor via Blackboard; students will also communicate with the instructor through the Blackboard about the end-of-semester project and submit the final project paper online. Web discussions are intended to facilitate critical thinking about statistics and build their capacity to improve her/his own learning. Discussion questions and asynchronous dialogue with other students in class on the web will enhance critical thinking.

2.How do you ensure that the experience for a DL student is comparable to that of a classroom-based student's experience? Aspects to explore: textbooks, course goals, assessment of student learning outcomes, etc. The course is designed to be delivered online, through asynchronous learning technology systems. The Distance Learning experience for students enrolled in this course will be highly comparable to the learning experience from classroom-based instruction. The web-based format aligns with effective adult learning formats and includes timely access to the course instructor and peers as well as feedback on discussion board forums and blackboard practice activities. The syllabus clearly explicates students' reading assignments including required textbook(s). All assessments are aligned with stated course objectives (goals). Instructor-student interaction is comparable to classroom instructional methods. Student performance is assessed by the instructor through participation in and monitoring of asynchronous, on-line interactions, observations of on-line discussions, feedback on Discussion board forums, and evaluation of homework and end-of-semester project (see syllabus).

3.How is the integrity of student work ensured? Please speak to aspects such as password-protected course portals, proctors for exams at interactive video sites; academic offense policy; etc. This online course will use University of Kentucky technology that protects the integrity of student work. The course will not require the use of examination proctors or other support staff or interactive video. The syllabus describes UK academic policies that apply in this course and those policies are articulated in the "Students Rights and Responsibilities Handbook" and "the UK Graduate Bulletin." Important policies and regulations applicable to this course are explicitly stated in the syllabus including attendance, cheating and plagiarism, course withdrawal, incomplete grades, and acceptable standards of English, absences, changes in the syllabus, standards for assessing the quality of student work and late work. A statement of student responsibilities is included (see syllabus).

4.Will offering this course via DL result in at least 25% or at least 50% (based on total credit hours required for completion) of a degree program being offered via any form of DL, as defined above? No

If yes, which percentage, and which program(s)? NA

5.How are students taking the course via DL assured of equivalent access to student services, similar to that of a student taking the class in a traditional classroom setting? All students in this online course have equal access to all student services at the University of Kentucky for which they qualify and those student services are similar to those available to individuals taking this class in a traditional (i.e. face-to-face) classroom setting. Access to student services is explicated on the University of Kentucky websites including but not limited to: (http://www.uky.edu.TASC/index.php) and (http://www.uky.edu/UKIT/). Students who have special needs or require accommodations of any kind will be advised to register with the UK Disability Resource Center for assistance. The course instructor will work with students on an individual basis to make appropriate accommodations to participate in the class and complete work (see syllabus).

6.How do course requirements ensure that students make appropriate use of learning resources? In addition to purchasing required textbooks, selected readings will be available through the University of Kentucky Libraries online reserve system or posted on the course website. Additionally, the program will provide support to students encountering technology problems in accessing the course content.

7.Please explain specifically how access is provided to laboratories, facilities, and equipment appropriate to the course or program. Access is provided via students' personal computer proxy access to online library resources (see syllabus).

8.How are students informed of procedures for resolving technical complaints? Does the syllabus list the entities available to offer technical help with the delivery and/or receipt of the course, such as the Information Technology Customer Service Center (http://www.uky.edu/UKIT/)?   Students are informed of the availability of University of Kentucky services in the syllabus (CELT, Blackboard, Canvas, help desk from the UKIT Customer Service Center, etc.). Blackboard / Canvas instructors have received required training in the use of the Course Management System, UK Libraries online resources (and EZ Proxy tools), and will assist students as needed. In sum, all students in this course have equal access to all student services at the University of Kentucky for which they qualify. Access to student services is explicated on the University of Kentucky websites including but not limited to: (http://www.uky.edu.TASC/index.php) and (http://www.uky.edu/UKIT/) (see syllabus).

9.Will the course be delivered via services available through the Distance Learning Program (DLP) and the Academic Technology Group (ATL)?   YES

If no, explain how student enrolled in DL courses are able to use the technology employed, as well as how students will be provided with assistance in using said technology.   Students will have access to the course content via Blackboard, supported by UKIT and CELT (the TASC successors).

10.Does the syllabus contain all the required components?   YES

11.I, the instructor of record, have read and understood all of the university-level statements regarding DL.

   Instructor Name: Hongwei Yang

   SIGNATURE|BETHG|Beth L Goldstein|EPE 660 CHANGE Dept Review|20140325

   SIGNATURE|KKMCGH0|Keisha Love|EPE 660 CHANGE Cross-List Chair Review|20140325

   SIGNATURE|MYRT|Martha L Geoghegan|EPE 660 CHANGE College Review|20140512

   SIGNATURE|ZNNIKO0|Roshan N Nikou|EPE 660 CHANGE Graduate Council Review|20141024

Courses	Request Tracking

Course Change Form

https://myuk.uky.edu/sap/bc/soap/rfc?services=

Generate R

Attachments:

Browse...   Upload File

	ID	Attachment
Delete	3283	EDPEPE 660 Digital Learning Syllabus (Finished on
Delete	3881	EDPEPE 660 Digital Learning Syllabus (Revised on O

First | 1 | Last

Select saved project to retrieve...   Get   New

NOTE: Start form entry by choosing the Current Prefix and Number
(*denotes required fields)

	Current Prefix and Number:	EPE - Edc. Policy Studies & Eval. ▼ EPE 660 RSRCH DESIGN & ANALYSIS IN EDUCATION ▼	Proposed Prefix & Number: (example: PHY 401G) ☐ Check if same as current	EDP/EPE 660
*	What type of change is being proposed?		☐ Major Change ☑ Major – Add Distance Learning ☐ Minor - change in number within the same hundred series, exception 60(the same "hundred series" ☐ Minor - editorial change in course title or description which does not imp in content or emphasis ☐ Minor - a change in prerequisite(s) which does not imply a change in cou content or emphasis, or which is made necessary by the elimination or signi alteration of the prerequisite(s) ☐ Minor - a cross listing of a course as described above	

Should this course be a UK Core Course? ○ Yes ◉ No

If YES, check the areas that apply:

☐ Inquiry - Arts & Creativity   ☐ Composition & Communications – II

☐ Inquiry - Humanities   ☐ Quantitative Foundations

☐ Inquiry - Nat/Math/Phys Sci   ☐ Statistical Inferential Reasoning

☐ Inquiry - Social Sciences   ☐ U.S. Citizenship, Community, Diversity

☐ Composition & Communications - I   ☐ Global Dynamics

1.	General Information				
a.	Submitted by the College of:	EDUCATION		Submission Date:	10/15/2014
b.	Department/Division:	Educational Policy Studies and Evaluatio			
c.*	Is there a change in "ownership" of the course?				
	○ Yes ◉ No If YES, what college/department will offer the course instead?				▼
e.*	* Contact Person Name:	Hongwei Yang	Email: hya222@uky.edu	Phone: 8592572330	
	* Responsible Faculty ID (if different from Contact)	Hongwei Yang	Email: hya222@uky.edu	Phone: 8592572330	
f.*	Requested Effective Date:	☐ Semester Following Approval	OR	Specific Term: [2] Spring 2015	

2.	**Designation and Description of Proposed Course.**		
a.	Current Distance Learning(DL) Status:	○ N/A ○ Already approved for DL* ◉ Please Add ○ Please Drop	

*If already approved for DL, the Distance Learning Form must also be submitted _unless_ the department affirms (by checking this box) tha proposed changes do not affect DL delivery.

b.	Full Title:	RESEARCH DESIGN AND ANALYSIS IN EDUCATION	Proposed Title: *	RESEARCH DESIGN AND ANALYSIS EDUCATION
c.	Current Transcript Title (if full title is more than 40 characters):		RSRCH DESIGN & ANALYSIS IN EDUCATION	

c.	Proposed Transcript Title (if full title is more than 40 characters):				RSRCH DESIGN & ANALYSIS IN EDUCATION		

d.	Current Cross-listing:	☐ N/A		OR	Currently[3] Cross-listed with (Prefix & Number):	Same as: EDP

Proposed – ADD[3] Cross-listing (Prefix & Number):

Proposed – REMOVE [3,4] Cross-listing (Prefix & Number):

e. Courses must be described by **at least one** of the meeting patterns below. Include number of actual contact hours [X] for each meeting pattern type.

Current:	Lecture 3	Laboratory[5]	Recitation	Discussion	Indep. Study
	Clinical	Colloquium	Practicum	Research	Residency
	Seminar	Studio	Other	Please explain:	

Proposed: *	Lecture 3	Laboratory[5]	Recitation	Discussion	Indep. Study
	Clinical	Colloquium	Practicum	Research	Residency
	Seminar	Studio	Other	Please explain:	

f.	Current Grading System:	Graduate School Grade Scale
	Proposed Grading System:*	○ Letter (A, B, C, etc.) ○ Pass/Fail ○ Medicine Numeric Grade (Non-medical students will receive a letter grade) ◉ Graduate School Grade Scale

g.	Current number of credit hours:	3	Proposed number of credit hours:*	3

h.*	Currently, is this course repeatable for additional credit?	○ Yes ◉ No
*	Proposed to be repeatable for additional credit?	○ Yes ◉ No
If YES:	Maximum number of credit hours:	NA
If YES:	Will this course allow multiple registrations during the same semester?	○ Yes ◉ No

i. Current Course Description for Bulletin:

This is a statistics-oriented course that focuses on various aspects of a regression analysis. Topics to be covered include, but are not limited to, simple correlation and regression, multiple regression (with and without interaction terms), regression diagnostics, logistic regression, etc. The course aims to familiarize students with cleaning data for regression analysis, building regression models, selecting the optimal regression analysis, building regression models, selecting the optimal regression model for the data in hand, gain requisite foundation knowledge necessary to learn more complex statistical tests and procedures, and become more critical of statistical presentations in academic journals and the mass media.

* Proposed Course Description for Bulletin:

This is a statistics-oriented course that focuses on various aspects of regression analysis (general and generalized linear models). Topics to be covered include, but are not limited to, simple correlation and regression, multiple regression (with and without interaction/moderation terms, with/without nonlinear terms, contrast variable coding for categorical predictors, nested model comparison for hierarchical regression, etc.), regression diagnostics (outlying and influential cases identification and assessment, collinearity evaluation, residual analysis, etc.), logistic regression (with a comparison of the logit model with other commonly used classification models like probit model, decision tree model, etc.), among other things. The course will familiarize students with cleaning data for regression analysis, building regression models, conducting statistical inference of regression models, selecting the optimal regression model(s) for the data in hand, and interpreting regression analysis results using the right language. Students will gain requisite foundation knowledge necessary

j. Current Prerequisites, if any:

Prereq: EPE/EDP 558 or consent of instructor

* Proposed Prerequisites, if any:

Prereq: EDP/EPE 558 or consent of instructor

k.	Current Supplementary Teaching Component, if any:	○ Community-Based Experience

		○ Service Learning ○ Both
	Proposed Supplementary Teaching Component:	○ Community-Based Experience ○ Service Learning ○ Both ◉ No Change

3.	Currently, is this course taught off campus?	○ Yes ◉ No
*	*Proposed to be taught off campus?*	◉ Yes ○ No
	If YES, enter the off campus address: Online via Blackboard at elearning.uky.edu	
4.*	Are significant changes in content/student learning outcomes of the course being proposed?	○ Yes ◉ No
	If YES, explain and offer brief rationale:	
	NA	

5.	Course Relationship to Program(s).	
a.*	Are there other depts and/or pgms that could be affected by the proposed change?	◉ Yes ○ No
	If YES, identify the depts. and/or pgms:	
	This course is taken by students from all departments in the College of Education. Students from other colleges on campus often take it as an elective, but to our knowledge is not required.	
b.*	**Will modifying this course result in a new requirement^Z for ANY program?**	○ Yes ◉ No
	If YES^Z, list the program(s) here:	
	NA	

6.	Information to be Placed on Syllabus.	
a.	☐ Check box if changed to 400G or 500.	If changed to 400G- or 500-level course you must send in a syllabus and *you must include the differentiation* between undergraduate and graduate students by: (i) requiring additional assignments by the graduate stud and/or (ii) establishing different grading criteria in the course for graduate students. (See *SR 3.1.4.*)

Distance Learning Form

This form must accompany every submission of a new/change course form that requests distance learning delivery. This form may be required when changing a course already approved for I
All fields are required!

Introduction/Definition: For the purposes of the Commission on Colleges Southern Association of Colleges and Schools accreditation review, *distance learning* is defined as educational process in which the majority of the instruction (interaction between students and instructors and among students) in a course occurs when students and instruct not in the same place. Instruction may be synchronous or asynchronous. A distance learning {DL) course may employ correspondence study, or audio, video, or computer technologies.

A number of specific requirements are listed for DL courses. The *department* proposing the change in delivery method is responsible for ensuring that the require below are satisfied at the individual course level. It is the responsibility of the instructor to have read and understood the university-level assurances regarding an equi experience for students utilizing DL (available at http://www.uky.edu/USC/New/forms.htm).

Course Number and Prefix:	EDP/EPE 660	Date:	3/23/2014
Instructor Name:	Hongwei Yang	Instructor Email:	hya222@uky.edu

Check the method below that best reflects how the majority of the course content will be delivered.

Internet/Web-based ☑   Interactive Video ☐   Hybrid ☐

Curriculum and Instruction

1. How does this course provide for timely and appropriate interaction between students and faculty and among students? Does the course syllabus conform to Univers Senate Syllabus Guidelines, specifically the Distance Learning Considerations?

   EDP/EPE 660 – RSRCH DESIGN & ANALYSIS IN EDUCATION (see attached syllabus) conforms to all University of Kentucky Distance Learning Syllabus Guidelines and specifically includes information about virtual office

2. How do you ensure that the experience for a DL student is comparable to that of a classroom-based student's experience? Aspects to explore: textbooks, course goa assessment of student learning outcomes, etc.

The course is designed to be delivered online, through asynchronous learning technology systems. The Distance Learning experience for students enrolled in this course will be highly comparable to the learning experience

3. How is the integrity of student work ensured? Please speak to aspects such as password-protected course portals, proctors for exams at interactive video sites; acac offense policy; etc.

This online course will use University of Kentucky technology that protects the integrity of student work. The course will not require the use of examination proctors or other support staff or interactive video. The

4. Will offering this course via DL result in at least 25% or at least 50%* (based on total credit hours required for completion) of a degree program being offered via a of DL, as defined above?

No

Which percentage, and which program(s)?

NA

*As a general rule, if approval of a course for DL delivery results in 50% or more of a program being delivered through DL, the effective date of the course's DL deliv be six months from the date of approval.

5. How are students taking the course via DL assured of equivalent access to student services, similar to that of a student taking the class in a traditional classroom se

All students in this online course have equal access to all student services at the University of Kentucky for which they qualify and those student services are similar to those available to individuals taking this class

Library and Learning Resources

6. How do course requirements ensure that students make appropriate use of learning resources?

In addition to purchasing required textbooks, selected readings will be available through the University of Kentucky Libraries online reserve system or posted on the course website. Additionally, the program will

7. Please explain specifically how access is provided to laboratories, facilities, and equipment appropriate to the course or program.

Access is provided via students' personal computer proxy access to online library resources (see syllabus).

Student Services

8. How are students informed of procedures for resolving technical complaints? Does the syllabus list the entities available to offer technical help with the delivery and/ receipt of the course, such as the Information Technology Customer Service Center (http://www.uky.edu/UKIT/)?

Students are informed of the availability of University of Kentucky services in the syllabus (CELT, Blackboard, Canvas, help desk from the UKIT Customer Service Center, etc.). Blackboard / Canvas instructors have received

9. Will the course be delivered via services available through the Distance Learning Program (DLP) and the Academic Technology Group (ATL)?

⦿ Yes
○ No

If no, explain how students enrolled in DL courses are able to use the technology employed, as well as how students will be provided with assistance in using said technology.

Students will have access to the course content via Blackboard, supported by UKIT and CELT (the TASC successors).

10. Does the syllabus contain all the required components, below? ☑ Yes

   - Instructor's *virtual* office hours, if any.
   - The technological requirements for the course.
   - Contact information for Distance Learning programs (http://www.uky.edu/DistanceLearning) and Information Technology Customer Service Center (http://www.uky.edu/UKIT/Help/; 859-218-HELP).
   - Procedure for resolving technical complaints.
   - Preferred method for reaching instructor, e.g. email, phone, text message.
   - Maximum timeframe for responding to student communications.
   - Language pertaining academic accommodations:
      - "If you have a documented disability that requires academic accommodations in this course, please make your request to the University Disability Res Center. The Center will require current disability documentation. When accommodations are approved, the Center will provide me with a Letter of Accommodation which details the recommended accommodations. Contact the Disability Resource Center, Jake Karnes, Director at 859-257-2754 or jkarnes@email.uky.edu."
   - Specific dates of face-to-face or synchronous class meetings, if any.
   - Information on Distance Learning Library Services (http://www.uky.edu/Libraries/DLLS)
      - Carla Cantagallo, DL Librarian
      - Local phone number: 859 257-0500, ext. 2171; long-distance phone number: (800) 828-0439 (option #6)
      - Email: dllservice@email.uky.edu
      - DL Interlibrary Loan Service: http://www.uky.edu/Libraries/libpage.php?lweb_id=253&llib_id=16

11. I, the instructor of record, have read and understood all of the university-level statements regarding DL.

Instructor Name:

Hongwei Yang

EDP/EPE 660 Distance Learning Section

RESEARCH DESIGN AND ANALYSIS IN EDUCATION

Spring 2015: Distance Learning Section
Proposal filed in March, 2014

Instructor:

- Dr. Hongwei Yang, Assistant Professor

- 143B Taylor Education Building (TEB, located at 597 South Upper Street)

- E-mail: 1) patrick.yang@uky.edu (preferred method for reaching instructor, for course-related questions only) and 2) regressioncourseexams@gmail.com (backup plan for submission of homework, proposal, project paper, etc. given any planned/unplanned Blackboard outage)

- Office phone: 859-257-2330

- Campus office hours: By appointment

- Virtual office hours: By appointment

- Skype ID: edpepe660

Course Website:

- https://elearning.uky.edu/ or Blackboard

    - Login using your link blue username and password
    - Please check our course website (i.e., announcements and discussion boards) and your E-mail account daily for course information.

Course Format:

The course is an asynchronous on-line course and it is structured so that students can learn at their own pace. However, students are still required to meet the due dates outlined in the course schedule. Further, students also need to participate in online class discussions/forums, complete homework assignments, ask for help if they have questions, and stay on task. Typically, students need to do the following in order to stay on task:

- Complete required readings

- Review (lecture) notes (both audio and non audio PowerPoint (PPT) notes)

- Review SPSS video tutorials provided by the instructor for a given statistical analysis

- Respond to discussion board threads via Blackboard by posing questions and providing comments for a given topic

- Complete homework assignments and, if any, additional assigned readings on time

- Complete an end-of-semester project

Class Participation via Discussion Board Threads/Forums:

Due to the course format, schedule and content, participating in online discussion board threads is essential to your learning. Students are encouraged to participate in all class discussions via Blackboard. Although participation is not graded in this course, you are required to respond to online discussion board threads and engage in asynchronous dialogue with the course community. Ultimately, it is up to you to decide how you respond to the online discussions, but the more you participate the more you can learn from the course, the online community, and the instructor.

However, students missing in excess of one-fifth (20%) of class discussions on Blackboard will result in a denial of course credit and will be awarded a grade of W for the course. To ensure you do not receive a grade of W, you must provide complete and thoughtful responses to discussion board threads.

Discussion board threads/forums will be created in Blackboard. Students must respond to the discussion board thread (post) thoughtfully by mid-night (EST) of the posted due date in the course schedule/announcement after carefully reading materials pertinent to the discussion board thread.

Discussion Board threads/forums are available within the Blackboard course by clicking on the link labeled Discussions.

Group Forums:

If you would like, the instructor can create a form for those wanting to form study groups to learn together. Just E-mail the instructor with each student's name within the group. Just let me know how the instructor can help. The goal is for you to learn and not just get a grade. Forming learning groups is the best way to learn some of the topics in this course.

Posting of Grades:

All homework assignments (and other types of assessments, if any, at the discretion of the instructor) will be graded and returned to students. All homework scores will be posted on Blackboard in a timely manner so that students are aware of their progress in the course. Given an anticipated delay in grading the homework assignments and posting the grades, an announcement will be made in Blackboard.

Communication and Timeframe Expection:

The instructor will communicate on a regular basis via E-mail and Blackboard announcements. You will be expected to check your E-mail (and Blackboard) daily for course related updates and information. If you need to communicate with the instructor, please use the title **EDP/EPE660Online** in the subject line of your E-mail message. As for the maximum timeframe for responding to student communication, students may expect the instructor to have responses to E-mail, phone, and Blackboard inquiries within 48 hours excluding weekends.

Course Description:

EDP/EPE 660 is an applied, intermediate research methodology course that focuses on the regression aspect of general/generalized linear modeling. The course begins with general linear models with one or multiple model effects and relevant issues during the modeling process. Topics covered include model formulation, model estimation (ordinary least squares with/without bootstrapping, and maximum likelihood estimation), statistical inference and model interpretation (R^2 statistic, ANOVA table for nested model comparison, individual model parameter estimates, etc.). The course also discusses model evaluation and selection using information model selection criteria (AIC, CAIC, SBC, etc.) and nested model comparison (F test under the ordinary least squares estimation only). Contrast variable coding schemes (dummy indicators only) for categorical predictors (after a brief mention of an alternative approach to handling categorical variables under the framework of categorical regression that uses optimal scaling), moderation/interaction effects (versus mediation effects), and higher order effects in the context of polynomial regression are presented along with demonstrations on how to operationalize those terms in multiple ways in SPSS. Variable selection is discussed in the context of the stepwise method and the all-possible-subsets method. Regression diagnostics are the last issue examined under the general linear model framework which include the handling of

outlying cases and influential cases, the assessment of presence and intensity of collinear relations between predictors, and residual analysis for evaluating model assumptions. After wrapping up linear modeling, the course proceeds to generalized linear modeling where the focus is on the binary logistic regression model for supervised classification. Issues covered here parallel those under linear modeling: Model formulation (using probability/odds/logit of the target event), model estimation (maximum likelihood estimation), statistical inference, model interpretation, model evaluation and selection, nested model comparison using the likelihood ratio test, etc. As for model fit statistics, the course emphasizes the misclassification rate table which is a model evaluation and selection criterion unique to classification techniques. The topic of logistic regression is followed by that of Poisson regression. Here, the course focuses on the analysis of a count/frequency outcome. The course first introduces poisson distribution and then formulates the poisson regression model for analyzing a count outcome. The course also discusses statistical inference issues related to poisson regression before proceeding to a comparison of the poisson regression model with the negative binomial regression model. Finally, the course also provides a brief introduction of various extensions of the linear model to help students gain a better idea of follow-up quantitative courses to take:

- Multivariate model versus **univariate model** - EDP 707

- Random effects model versus **fixed effects model** - EDP/EPE 711 in Multilevel Analysis

- Correlated errors versus **uncorrelated errors** - Time series modeling and/or longitudinal data analysis (EDP/EPE 711 in Structural Equation Modeling (SEM) with an application in latent growth curve modeling (LGM) or EDP/EPE 711 in Multilevel Analysis)

- Non-normality of error versus **normality of error** - EDP/EPE 711 in Categorical Data Analysis using the SAS program

Course Goals:

1. Become familiar with various regression models, and understand how to identify the right model for the data

   - Understand two families of models: 1) General linear models, and 2) generalized linear models

2. Be able to formulate research question(s) under regression analysis, conduct the analysis, and interpret the results

3. Learn multiple SPSS Statistics procedures: REGRESSION, LINEAR, CURVEFIT, GENLIN, LOGISTIC REGRESSION, MULTIPLE IMPUTATION, etc.

4. Learn to program in SPSS Syntax Editor

Integration of Syllabus with UK College of Education Conceptual Framework:

This course addresses the four themes within the conceptual framework of the UK College of Education: Research, reflection, learning, and leading. Throughout the course, students take advantage of regression modeling to review, analyze, discuss, and apply research from diverse perspectives in education, including professional scholarship and practitioner inquiry. During the process, students reflect on their own practices as educators or future educators as they study, observe, and work in education. Reflection is integrated regularly through written communication to help students hone their analytical and problem-solving skills that comprise critical professional reflection on one's own practice. This course emphasizes the commitment of the UK College of Education to ensure that its graduates continue their professional careers equipped for life-long learning as educators actively leading colleagues in their schools, districts, and/or profession. The ultimate goal in addressing these four themes is to produce educational leaders who work together to improve student learning among diverse populations and improve education in Kentucky and beyond.

Expectations and How to Succeed in This Course:

In a regular course, students meet for about three hours of class time and are expected to devote two to three hours per week per credit outside of class time. Thus, a typical course consumes about 9 to 12 hours of your time per week over a 15 week semester. This course is constructed to meet these expectations! It is usually helpful to schedule blocks of time during each week for your participation in the course, much as you would if you were coming to campus for a class or meeting a study group for a beverage. It is not true that virtual/online courses require less time or effort than a face-to-face course! Be ready to learn!

Required Textbook:

- Mendenhall, W., & Sincich, T. (2011). *A second course in statistics: Regression analysis* (7th ed.). Upper Saddle River, NJ: Prentice Hall.

Recommending Reading:

- American Psychological Association. (2009). *Publication manual of the American Psychological Association* (6th ed.). Washington, DC: Author.

    - APA style guide for publication

- Azen, R., & Walker, C. M. (2011). *Categorical data analysis for the behavioral and social sciences.* NYC, NY: Routledge.

    - Extension of the linear model (discussed in this course) to cover non-continuous as well as continuous outcomes: Categorical, count, etc.

- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

    - Another classical text on this topic

- Field, A. (2013). *Discovering statistics using SPSS* (4th ed.). Thousand Oaks, CA: Sage.

    - Another classical text on this topic with a focus on the use of SPSS Statistics

- Fox, J. (2008). *Applied regression analysis and generalized linear models* (2nd ed.). Thousand Oaks, CA: Sage.

    - Written by social science researcher. Relatively technical. Useful for those interested in quantitative research

- Hox, J. J. (2010). *Multilevel analysis* (2nd ed.). NYC, NY: Routledge.

    - Extension of the general/generalized linear model to the general/generalized linear mixed model for multilevel cross-sectional and/or longitudinal data, a.k.a., hierarchical linear model (HLM), hierarchical generalized linear model, etc.

- Huck, S. (2011). *Reading statistics and research* (6th ed.). Boston, MA: Addison Wesley.

    - Useful for consumers of statistical information (including regression) from applied research

Additional Course Readings:

Additional readings related to course content will be assigned during the semester via E-mail, course announcements, or as listed in the course schedule. These additional course readings may include articles, cases, blogs, wikis, online resources, and videos. When such readings are required, they will be provided by the instructor in advance. Additional readings may be assigned throughout the course duration at the discretion of the instructor. Most required materials for this course are available on the blackboard site (https://elearning.uky.edu).

Prerequisite:

EDP/EPE 557 or an introductory statistics course. Specifically, the course assumes a knowledge of basic techniques of applied statistics, including normal distribution, confidence intervals, hypothesis tests (i.e., one and two-sample t-tests, etc.), basics of linear regression and analysis of variance (ANOVA).

Grading:

The course uses a letter grade that is based on the Graduate School Grade Scale. There will be 3 comprehensive homework assignments and a final course project (a two-page, double-space proposal is due during the semester). The project counts 25% of the final grade, and the remaining proportion (75%) is equally distributed across homework assignments.

Given three homework assignments, they will count toward the final grade as follows:

Comprehensive Homework 1	25%
Comprehensive Homework 2	25%
Comprehensive Homework 3	25%
Course project (with proposal)	25%

- Course grades will be earned as follows: A (High Achievement): 90% and above; B (Good Achievement): 80%-89%; C (Minimum Passing Achievement): 70-79%; E (Unsatisfactory Achievement): 69% and below

- The grading arrangement for this course is subject to change at the instructor's discretion after consulting with the students

Incomplete Grade:

Incomplete grades for this course are issued reluctantly and sparingly. The university permits students one calendar year-unless a shorter time frame is determined mutually by the student and instructor-to remove an "I" grade. If the contracted work is not completed satisfactorily, the "I" grade converts automatically to an "E" (a failing mark). UK rules require students requesting an "I" grade to complete a contract specifying how and when the "I" will be removed within the calendar year. The contract must be submitted to the course instructor before an "I" grade can be issued. Incomplete work and missing assessments will be assigned "E" grades if the student does not submit a completed Incomplete Grade Contract by the time the course ends.

Homework Assignments:

For comprehensive homework assignments (and, if any, additional assigned readings, discussion board participation, related course activities, etc.), it is mandatory for students to complete all of them. Homework assignments (with instructions) are all distributed electronically to the class through Blackboard and E-mail. Students are usually given one week to finish each homework and a due date is provided on the course schedule with regard to each individual assignment. All assignments are due by 11:59:59 PM Eastern Standard Time (EST) on the due date specified in the course schedule and are to be submitted through Blackboard using the last 4 digits of your UK student identification number. The due date is always the last day of the week (i.e., Saturday) indicated in the course schedule. In order to achieve and maintain sufficient progress in this web-based course, it is necessary to complete and submit assignments (and class activities, if any) by the due date indicated. The submission window will close for each respective assignment after the due date indicated. Failure to submit an assignment by the due date could result in a failing grade for the assignment unless prior arrangements are made with the course instructor.

Acceptance of late assignments is at the discretion of the course instructor. Acceptable reasons for excused absences/late assignments are listed in Student Rights and Responsibilities (Senate Rule 5.2.4.2, details to be provided later in the syllabus). Most of the time, exceptions will be made **ONLY** in extreme circumstances, such as (but are not limited to) an incapacitating illness or injury, or a death in the family. Since the course materials are posted on Blackboard, events such as (but are not limited to) vacation/travel plans, social obligations, or family gatherings do not constitute exceptions. According to university guidelines, students are allowed an excused absence for specified reasons. The burden of proof is on the student; sufficient documentation may be required.

End-of-Semester Project:

For the end-of-semester project, a project proposal is required and is due on or before the first Monday after the university spring break of the semester. In the proposal, please describe the data set and the questions that you plan to answer with it. The data description should be clear and complete, covering such things as 1) your outcome variable (DV), 2) your predictors (IV's), 3) what the relationship should be between the DV and the IV's based on the existing literature, the experts' opinions, and/or your own hypothesis, 4) what it is that you would like to find support for/against from the analysis of the data using the selected type of regression model that you plan to build, etc. Please limit the length of the proposal to two double-space pages, excluding references, figures, and/or tables, if any.

The project could be any topic that implements regression analysis. Given the three types of regression models that we plan to primarily cover: 1) Linear regression model (simple/multiple), 2) binary logistic regression model, and 3) poisson regression model, you could find an interested data set for analysis that uses any of the three types of models. The data set could come from any of these sources: 1) Online database (say, TIMSS, NAEP, PISA, etc.), 2) data that you collected, and 3) data from another paper (preferably from a peer-reviewed journal article in education or psychology). You can choose to replicate or cross-validate the results of a regression analysis in a peer-reviewed journal article. Given such a choice, you should state so at the beginning of the project (with full citation information of the article included) and also explain what it is that motivates you to replicate or cross-validate the research. You should also conduct your own regression analysis and present the output from your own analysis instead of using the existing information (tables, graphs, etc.) from the article. For one reason or another, it is not uncommon that the published results from a journal article just cannot be replicated even if you have followed exactly the same steps using exactly the same data set under exactly the same family of models. In that case, you need to acknowledge at the end of the project that you have failed to replicate their published results. Remember that you do not need to have access to the raw data to run a regression analysis. Many times, a summary of the raw data (a correlation matrix along with standard deviations, sample sizes, and means for all variables) is all you need to specify and estimate regression models. In many published articles, such information is typically made available by the author(s).

As for the process of regression analysis after the data set is already selected, previous students of the course usually ran a stepwise regression to select important predictors first and then, with selected predictors, constructed and tested one or two interaction (a.k.a., moderation) effects that they hypothesized might exist. They concluded with a summary of findings from the model finally selected and fitted. Of course, the entire analysis should be based on a correct choice of the type of regression model (general linear, generalized linear, etc.) for the selected data set.

More specifics about the project paper are listed below:

1. Submission of project paper: Microsoft Word document submitted electronically through Blackboard

2. Length of project paper: 20 to 25 pages

3. Language, style, and format: Publication Manual of the American Psychological Association (6th ed., 2009)

4. Submission of project paper by: 5:00 PM (EST) on May 08, 2015

Software Package:

SPSS Statistics 22 will be used extensively in the class. The program is available for download at https://download.uky.edu/, and it is available for both PC and Mac computers. After the program is downloaded, you will need to finish a brief online survey to have the license code sent to your UKY E-mail account electronically. In addition, SPSS Statistics is housed at a variety of locations on campus, including the university computer labs, the College of Education ITC labs, the Education Library, etc. To get a list of lab hours, please visit http://www.uky.edu/ukit/labs/hours and http://education.uky.edu/ITC/. Students are welcome to use other statistics programs as well, such as R, SAS, or JMP. But I will not provide any technical support for the use of such programs.

- Some of you may still have earlier versions of SPSS installed on your computer. It is acceptable for this course. However, I encourage you to replace the older program with its latest version because of the new features (and updates, as well) that have recently been added to it

- SPSS Statistics 22 documentation: http://www-01.ibm.com/support/docview.wss?uid=swg27038407

- SPSS AMOS 22 documentation: http://www-01.ibm.com/support/docview.wss?uid=swg27038441

SPSS Statistics Procedures Covered in EDP/EPE 660:

- Data handling: DESCRIPTIVES, EXAMINE, AGGREGATE, COMPUTE, MATRIX, MULTIPLE IMPUTATION, RMV, RESTRUCTURE DATA, SCORING WIZARD, etc.

- For linear regression: REGRESSION, LINEAR, CURVEFIT, and GENLIN

- For logistic regression: LOGISTIC REGRESSION, PROBIT, and GENLIN

- For poisson regression: GENLIN

Required Instructional Technology:

This course requires use of information technology. Students are expected to have regular access to a personal computer with audio capabilities, the Internet to complete their learning activities, Microsoft Word, PowerPoint, and Excel, Adobe Reader, and a high quality webcam and headset to complete their learning activities. All Web-based activities are to be completed within designated sections of the course site (e.g., Blackboard, google document).

All materials (slides, notes, assignments, data sets, SPSS syntax/script/macro files, etc.) for this course will be posted on Blackboard (https://elearning.uky.edu). Additional course readings, materials, and/or handouts will be provided by the instructor as needed.

Teaching and Academic Support:

- Contact the Teaching and Academic Support Center at http://www.uky.edu.TASC/index.phpr or 859-257-8772 (☎)

Procedures to Resolve Technical Problems:

- Contact the Information Technology Customer Service Center at http://www.uky.edu/UKIT/ or 859-257-1300 (☎)

Information on Distance Learning Library Services:

- http://www.uky.edu/Libraries/DLLS

- Carla Cantagallo, DL Librarian

- Local phone number: 859-257-0500, ext. 2171

- Long-distance phone number: (800) 828-0439 (option #6)

- Email: dllservice@email.uky.edu

- DL Interlibrary Loan Service: http://www.uky.edu/Libraries/libpage.php?lweb_id=253&llib_id=16

Student Menu of Blackboard Support:

- http://wiki.uky.edu/blackboard/Wiki%20Pages/Home.aspx.

- Local phone number: (859) 257-1300

- Email: helpdesk@uky.edu

Other Technical Assistance or Complaints:

- College of Education Instructional Technology Center: 859-257-7967 (☎)

- Information Technology Customer Service Center:

  - http://www.uky.edu/UKIT/Help/
  - 859-218-HELP (☎)

- Distance Learning programs for assistance: http://www.uky.edu/DistanceLearning

Attendance:

Students are expected to review and read all course materials in the week the materials are available. This includes having read assigned chapters of the text, course slides/notes/handouts, assigned journal articles and any other additional materials. There are situations when absences are excused and extensions are granted. See below for policy on excused absences. Students are also expected to attend class, complete homework assignments and participate in activities and discussions.

Excused Absences

Students need to notify the instructor of absences prior to class when possible. Senate Rule 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the instructor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754 (☎)). Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

Academic Integrity

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university, may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: http://www.uky.edu/Ombud. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Part II of Student Rights and Responsibilities (Available online at http://www.uky.edu/StudentAffairs/Code/part2.htm)

This provision states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, and is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of

plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.

Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them.

If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Accommodations for Disabled Students:

If you have a documented disability that requires academic accommodations in this course, please make your request to the University Disability Resource Center. The Center will require current disability documentation. When accommodations are approved, the Center will provide the instructor with a Letter of Accommodation which details the recommended accommodations. Contact the Disability Resource Center, Jake Karnes, Director at 859-257-2754 (☎) or jkarnes@email.uky.edu.

Commitment to Diversity:

Given the diverse world that we live in, students are asked to demonstrate a personal commitment to being knowledgeable, aware, and respectful of cultural diversity, culturally appropriate research, and how experiences (their own and others) of privilege and oppression impact interpersonal communication and social justice. Students are encouraged to challenge themselves to grow and change in ways that make themselves more culturally- and socially-competent learners. The course will be conducted with openness and respect to all individuals' points of view and experience. The activities and discussions will not tolerate discrimination or prejudice toward any person or group's religion, ethnicity, disability, gender, or sexual orientation.

TENTATIVE Course Schedule (Subject to change)

A summary of the topics to be covered is found in the following table. Please know that the instructor retains the right to modify this list of topics, if necessary, to better meet the learning objectives of this course. Changes to the topics will be discussed with students and provided in writing as an addendum distributed electronically via e-mail and posted on the course Blackboard.

Table 1: Tentative Schedule for Spring 2015 EDP/EPE 660 Distance Learning Section: RESEARCH DESIGN & ANALYSIS IN EDUCATION

Date	Topic(s)	Note	Chapters
Week 01	Course overview, SPSS tutorial		1 & 2
Week 02	Introduction to regression, and simple linear regression		2 & 3
Week 03	Simple linear regression: Probabilistic model and the OLS method		3
Week 04	Multiple regression: Probabilistic model, assumptions, estimation, model selection	HW 1 due	4
Week 05	Multiple regression: ANOVA & nested models; contrasts for categorical predictors		4 & 5
Week 06	Multiple regression: Polynomial models, regression when raw data are unavailable		4 & 5
Week 07	Subset selection: Stepwise, all possible subsets, information criteria		6
Week 08	Regression diagnostics: Collinearity	HW 2 due	7
Week 09	Regression diagnostics: Outliers and influential cases		8
Week 10	No class	Spring break	
Week 11	Regression diagnostics: Residuals and residual plots		8
Week 12	Classification: Logistic regression (logit model): exponential function, logit		9
Week 13	Classification: Logit model for a binary outcome (versus probit model)		9
Week 14	Classification: Logistic regression interpretation, accuracy, cross-validation		9
Week 15	Poisson regression: Count outcome, poisson distribution, logarithm function	HW 3 due	Course notes
Week 16	Poisson regression: Over-dispersion, versus negative binomial model		Course notes

EDP/EPE 660 Distance Learning Section

RESEARCH DESIGN AND ANALYSIS IN EDUCATION

Spring 2015: Distance Learning Section
Proposal filed in March, 2014

Instructor:

- Dr. Hongwei Yang, Assistant Professor

- 143B Taylor Education Building (TEB, located at 597 South Upper Street)

- E-mail: 1) patrick.yang@uky.edu (preferred method for reaching instructor, for course-related questions only) and 2) regressioncourseexams@gmail.com (backup plan for submission of homework, proposal, project paper, etc. given any planned/unplanned Blackboard outage)

- Office phone: 859-257-2330

- Campus office hours: By appointment

- Virtual office hours: By appointment

- Skype ID: edpepe660

Course Website:

- https://elearning.uky.edu/ or Blackboard

  - Login using your link blue username and password
  - Please check our course website (i.e., announcements and discussion boards) and your E-mail account daily for course information.

Course Format:

The course is an asynchronous on-line course and it is structured so that students can learn at their own pace. However, students are still required to meet the due dates outlined in the course schedule. Further, students also need to participate in online class discussions/forums, complete homework assignments, ask for help if they have questions, and stay on task. Typically, students need to do the following in order to stay on task:

- Complete required readings

- Review (lecture) notes (both audio and non audio PowerPoint (PPT) notes)

- Review SPSS video tutorials provided by the instructor for a given statistical analysis

- Respond to discussion board threads via Blackboard by posing questions and providing comments for a given topic

- Complete homework assignments and, if any, additional assigned readings on time

- Complete an end-of-semester project

Class Participation via Discussion Board Threads/Forums:

Due to the course format, schedule and content, participating in online discussion board threads is essential to your learning. Students are encouraged to participate in all class discussions via Blackboard. Although participation is not graded in this course, you are required to respond to online discussion board threads and engage in asynchronous dialogue with the course community. Ultimately, it is up to you to decide how you respond to the online discussions, but the more you participate the more you can learn from the course, the online community, and the instructor.

However, students missing in excess of one-fifth (20%) of class discussions on Blackboard will result in a denial of course credit and will be awarded a grade of W for the course. To ensure you do not receive a grade of W, you must provide complete and thoughtful responses to discussion board threads.

Discussion board threads/forums will be created in Blackboard. Students must respond to the discussion board thread (post) thoughtfully by mid-night (EST) of the posted due date in the course schedule/announcement after carefully reading materials pertinent to the discussion board thread.

Discussion Board threads/forums are available within the Blackboard course by clicking on the link labeled Discussions.

Group Forums:

If you would like, the instructor can create a form for those wanting to form study groups to learn together. Just E-mail the instructor with each student's name within the group. Just let me know how the instructor can help. The goal is for you to learn and not just get a grade. Forming learning groups is the best way to learn some of the topics in this course.

Posting of Grades:

All homework assignments (and other types of assessments, if any, at the discretion of the instructor) will be graded and returned to students. All homework scores will be posted on Blackboard in a timely manner so that students are aware of their progress in the course. Given an anticipated delay in grading the homework assignments and posting the grades, an announcement will be made in Blackboard.

Communication and Timeframe Expection:

The instructor will communicate on a regular basis via E-mail and Blackboard announcements. You will be expected to check your E-mail (and Blackboard) daily for course related updates and information. If you need to communicate with the instructor, please use the title **EDP/EPE660Online** in the subject line of your E-mail message. As for the maximum timeframe for responding to student communication, students may expect the instructor to have responses to E-mail, phone, and Blackboard inquiries within 48 hours excluding weekends.

Course Description:

EDP/EPE 660 is an applied, intermediate research methodology course that focuses on the regression aspect of general/generalized linear modeling. The course begins with general linear models with one or multiple model effects and relevant issues during the modeling process. Topics covered include model formulation, model estimation (ordinary least squares with/without bootstrapping, and maximum likelihood estimation), statistical inference and model interpretation (R^2 statistic, ANOVA table for nested model comparison, individual model parameter estimates, etc.). The course also discusses model evaluation and selection using information model selection criteria (AIC, CAIC, SBC, etc.) and nested model comparison (F test under the ordinary least squares estimation only). Contrast variable coding schemes (dummy indicators only) for categorical predictors (after a brief mention of an alternative approach to handling categorical variables under the framework of categorical regression that uses optimal scaling), moderation/interaction effects (versus mediation effects), and higher order effects in the context of polynomial regression are presented along with demonstrations on how to operationalize those terms in multiple ways in SPSS. Variable selection is discussed in the context of the stepwise method and the all-possible-subsets method. Regression diagnostics are the last issue examined under the general linear model framework which include the handling of

outlying cases and influential cases, the assessment of presence and intensity of collinear relations between predictors, and residual analysis for evaluating model assumptions. After wrapping up linear modeling, the course proceeds to generalized linear modeling where the focus is on the binary logistic regression model for supervised classification. Issues covered here parallel those under linear modeling: Model formulation (using probability/odds/logit of the target event), model estimation (maximum likelihood estimation), statistical inference, model interpretation, model evaluation and selection, nested model comparison using the likelihood ratio test, etc. As for model fit statistics, the course emphasizes the misclassification rate table which is a model evaluation and selection criterion unique to classification techniques. The topic of logistic regression is followed by that of Poisson regression. Here, the course focuses on the analysis of a count/frequency outcome. The course first introduces poisson distribution and then formulates the poisson regression model for analyzing a count outcome. The course also discusses statistical inference issues related to poisson regression before proceeding to a comparison of the poisson regression model with the negative binomial regression model. Finally, the course also provides a brief introduction of various extensions of the linear model to help students gain a better idea of follow-up quantitative courses to take:

- Multivariate model versus **univariate model** - EDP 707

- Random effects model versus **fixed effects model** - EDP/EPE 711 in Multilevel Analysis

- Correlated errors versus **uncorrelated errors** - Time series modeling and/or longitudinal data analysis (EDP/EPE 711 in Structural Equation Modeling (SEM) with an application in latent growth curve modeling (LGM) or EDP/EPE 711 in Multilevel Analysis)

- Non-normality of error versus **normality of error** - EDP/EPE 711 in Categorical Data Analysis using the SAS program

Course Goals:

1. Become familiar with various regression models, and understand how to identify the right model for the data

   - Understand two families of models: 1) General linear models, and 2) generalized linear models

2. Be able to formulate research question(s) under regression analysis, conduct the analysis, and interpret the results

3. Learn multiple SPSS Statistics procedures: REGRESSION, LINEAR, CURVEFIT, GENLIN, LOGISTIC REGRESSION, MULTIPLE IMPUTATION, etc.

4. Learn to program in SPSS Syntax Editor

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This course addresses the four themes within the conceptual framework of the UK College of Education: Research, reflection, learning, and leading. Throughout the course, students take advantage of regression modeling to review, analyze, discuss, and apply research from diverse perspectives in education, including professional scholarship and practitioner inquiry. During the process, students reflect on their own practices as educators or future educators as they study, observe, and work in education. Reflection is integrated regularly through written communication to help students hone their analytical and problem-solving skills that comprise critical professional reflection on one's own practice. This course emphasizes the commitment of the UK College of Education to ensure that its graduates continue their professional careers equipped for life-long learning as educators actively leading colleagues in their schools, districts, and/or profession. The ultimate goal in addressing these four themes is to produce educational leaders who work together to improve student learning among diverse populations and improve education in Kentucky and beyond.

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Required Textbook:

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Recommending Reading:

- American Psychological Association. (2009). *Publication manual of the American Psychological Association* (6th ed.). Washington, DC: Author.

    - APA style guide for publication

- Azen, R., & Walker, C. M. (2011). *Categorical data analysis for the behavioral and social sciences.* NYC, NY: Routledge.

    - Extension of the linear model (discussed in this course) to cover non-continuous as well as continuous outcomes: Categorical, count, etc.

- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

    - Another classical text on this topic

- Field, A. (2013). *Discovering statistics using SPSS* (4th ed.). Thousand Oaks, CA: Sage.

    - Another classical text on this topic with a focus on the use of SPSS Statistics

- Fox, J. (2008). *Applied regression analysis and generalized linear models* (2nd ed.). Thousand Oaks, CA: Sage.

    - Written by social science researcher. Relatively technical. Useful for those interested in quantitative research

- Hox, J. J. (2010). *Multilevel analysis* (2nd ed.). NYC, NY: Routledge.

    - Extension of the general/generalized linear model to the general/generalized linear mixed model for multilevel cross-sectional and/or longitudinal data, a.k.a., hierarchical linear model (HLM), hierarchical generalized linear model, etc.

- Huck, S. (2011). *Reading statistics and research* (6th ed.). Boston, MA: Addison Wesley.

    - Useful for consumers of statistical information (including regression) from applied research

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Additional readings related to course content will be assigned during the semester via E-mail, course announcements, or as listed in the course schedule. These additional course readings may include articles, cases, blogs, wikis, online resources, and videos. When such readings are required, they will be provided by the instructor in advance. Additional readings may be assigned throughout the course duration at the discretion of the instructor. Most required materials for this course are available on the blackboard site (https://elearning.uky.edu).

Prerequisite:

EDP/EPE 557 or an introductory statistics course. Specifically, the course assumes a knowledge of basic techniques of applied statistics, including normal distribution, confidence intervals, hypothesis tests (i.e., one and two-sample t-tests, etc.), basics of linear regression and analysis of variance (ANOVA).

Grading:

The course uses a letter grade that is based on the Graduate School Grade Scale. There will be 3 comprehensive homework assignments and a final course project (a two-page, double-space proposal is due during the semester). The project counts 25% of the final grade, and the remaining proportion (75%) is equally distributed across homework assignments.

Given three homework assignments, they will count toward the final grade as follows:

Comprehensive Homework 1	25%
Comprehensive Homework 2	25%
Comprehensive Homework 3	25%
Course project (with proposal)	25%

- Course grades will be earned as follows: A (High Achievement): 90% and above; B (Good Achievement): 80%-89%; C (Minimum Passing Achievement): 70-79%; E (Unsatisfactory Achievement): 69% and below

- The grading arrangement for this course is subject to change at the instructor's discretion after consulting with the students

Incomplete Grade:

Incomplete grades for this course are issued reluctantly and sparingly. The university permits students one calendar year-unless a shorter time frame is determined mutually by the student and instructor-to remove an "I" grade. If the contracted work is not completed satisfactorily, the "I" grade converts automatically to an "E" (a failing mark). UK rules require students requesting an "I" grade to complete a contract specifying how and when the "I" will be removed within the calendar year. The contract must be submitted to the course instructor before an "I" grade can be issued. Incomplete work and missing assessments will be assigned "E" grades if the student does not submit a completed Incomplete Grade Contract by the time the course ends.

Homework Assignments:

For comprehensive homework assignments (and, if any, additional assigned readings, discussion board participation, related course activities, etc.), it is mandatory for students to complete all of them. Homework assignments (with instructions) are all distributed electronically to the class through Blackboard and E-mail. Students are usually given one week to finish each homework and a due date is provided on the course schedule with regard to each individual assignment. All assignments are due by 11:59:59 PM Eastern Standard Time (EST) on the due date specified in the course schedule and are to be submitted through Blackboard using the last 4 digits of your UK student identification number. The due date is always the last day of the week (i.e., Saturday) indicated in the course schedule. In order to achieve and maintain sufficient progress in this web-based course, it is necessary to complete and submit assignments (and class activities, if any) by the due date indicated. The submission window will close for each respective assignment after the due date indicated. Failure to submit an assignment by the due date could result in a failing grade for the assignment unless prior arrangements are made with the course instructor.

Acceptance of late assignments is at the discretion of the course instructor. Acceptable reasons for excused absences/late assignments are listed in Student Rights and Responsibilities (Senate Rule 5.2.4.2, details to be provided later in the syllabus). Most of the time, exceptions will be made **ONLY** in extreme circumstances, such as (but are not limited to) an incapacitating illness or injury, or a death in the family. Since the course materials are posted on Blackboard, events such as (but are not limited to) vacation/travel plans, social obligations, or family gatherings do not constitute exceptions. According to university guidelines, students are allowed an excused absence for specified reasons. The burden of proof is on the student; sufficient documentation may be required.

End-of-Semester Project:

For the end-of-semester project, a project proposal is required and is due on or before the first Monday after the university spring break of the semester. In the proposal, please describe the data set and the questions that you plan to answer with it. The data description should be clear and complete, covering such things as 1) your outcome variable (DV), 2) your predictors (IV's), 3) what the relationship should be between the DV and the IV's based on the existing literature, the experts' opinions, and/or your own hypothesis, 4) what it is that you would like to find support for/against from the analysis of the data using the selected type of regression model that you plan to build, etc. Please limit the length of the proposal to two double-space pages, excluding references, figures, and/or tables, if any.

The project could be any topic that implements regression analysis. Given the three types of regression models that we plan to primarily cover: 1) Linear regression model (simple/multiple), 2) binary logistic regression model, and 3) poisson regression model, you could find an interested data set for analysis that uses any of the three types of models. The data set could come from any of these sources: 1) Online database (say, TIMSS, NAEP, PISA, etc.), 2) data that you collected, and 3) data from another paper (preferably from a peer-reviewed journal article in education or psychology). You can choose to replicate or cross-validate the results of a regression analysis in a peer-reviewed journal article. Given such a choice, you should state so at the beginning of the project (with full citation information of the article included) and also explain what it is that motivates you to replicate or cross-validate the research. You should also conduct your own regression analysis and present the output from your own analysis instead of using the existing information (tables, graphs, etc.) from the article. For one reason or another, it is not uncommon that the published results from a journal article just cannot be replicated even if you have followed exactly the same steps using exactly the same data set under exactly the same family of models. In that case, you need to acknowledge at the end of the project that you have failed to replicate their published results. Remember that you do not need to have access to the raw data to run a regression analysis. Many times, a summary of the raw data (a correlation matrix along with standard deviations, sample sizes, and means for all variables) is all you need to specify and estimate regression models. In many published articles, such information is typically made available by the author(s).

As for the process of regression analysis after the data set is already selected, previous students of the course usually ran a stepwise regression to select important predictors first and then, with selected predictors, constructed and tested one or two interaction (a.k.a., moderation) effects that they hypothesized might exist. They concluded with a summary of findings from the model finally selected and fitted. Of course, the entire analysis should be based on a correct choice of the type of regression model (general linear, generalized linear, etc.) for the selected data set.

More specifics about the project paper are listed below:

1. Submission of project paper: Microsoft Word document submitted electronically through Blackboard

2. Length of project paper: 20 to 25 pages

3. Language, style, and format: Publication Manual of the American Psychological Association (6th ed., 2009)

4. Submission of project paper by: 5:00 PM (EST) on May 08, 2015

Software Package:

SPSS Statistics 22 will be used extensively in the class. The program is available for download at `https://download.uky.edu/`, and it is available for both PC and Mac computers. After the program is downloaded, you will need to finish a brief online survey to have the license code sent to your UKY E-mail account electronically. In addition, SPSS Statistics is housed at a variety of locations on campus, including the university computer labs, the College of Education ITC labs, the Education Library, etc. To get a list of lab hours, please visit `http://www.uky.edu/ukit/labs/hours` and `http://education.uky.edu/ITC/`. Students are welcome to use other statistics programs as well, such as R, SAS, or JMP. But I will not provide any technical support for the use of such programs.

- Some of you may still have earlier versions of SPSS installed on your computer. It is acceptable for this course. However, I encourage you to replace the older program with its latest version because of the new features (and updates, as well) that have recently been added to it

- SPSS Statistics 22 documentation: http://www-01.ibm.com/support/docview.wss?uid=swg27038407

- SPSS AMOS 22 documentation: http://www-01.ibm.com/support/docview.wss?uid=swg27038441

SPSS Statistics Procedures Covered in EDP/EPE 660:

- Data handling: DESCRIPTIVES, EXAMINE, AGGREGATE, COMPUTE, MATRIX, MULTIPLE IMPUTATION, RMV, RESTRUCTURE DATA, SCORING WIZARD, etc.

- For linear regression: REGRESSION, LINEAR, CURVEFIT, and GENLIN

- For logistic regression: LOGISTIC REGRESSION, PROBIT, and GENLIN

- For poisson regression: GENLIN

Required Instructional Technology:

This course requires use of information technology. Students are expected to have regular access to a personal computer with audio capabilities, the Internet to complete their learning activities, Microsoft Word, PowerPoint, and Excel, Adobe Reader, and a high quality webcam and headset to complete their learning activities. All Web-based activities are to be completed within designated sections of the course site (e.g., Blackboard, google document).

All materials (slides, notes, assignments, data sets, SPSS syntax/script/macro files, etc.) for this course will be posted on Blackboard (https://elearning.uky.edu). Additional course readings, materials, and/or handouts will be provided by the instructor as needed.

Teaching and Academic Support:

- Contact the Teaching and Academic Support Center at http://www.uky.edu.TASC/index.phpr or 859-257-8772 (☎)

Procedures to Resolve Technical Problems:

- Contact the Information Technology Customer Service Center at http://www.uky.edu/UKIT/ or 859-257-1300 (☎)

Information on Distance Learning Library Services:

- http://www.uky.edu/Libraries/DLLS

- Carla Cantagallo, DL Librarian

- Local phone number: 859-257-0500, ext. 2171

- Long-distance phone number: (800) 828-0439 (option #6)

- Email: dllservice@email.uky.edu

- DL Interlibrary Loan Service: http://www.uky.edu/Libraries/libpage.php?lweb_id=253&llib_id=16

Student Menu of Blackboard Support:

- http://wiki.uky.edu/blackboard/Wiki%20Pages/Home.aspx.

- Local phone number: (859) 257-1300

- Email: helpdesk@uky.edu

Other Technical Assistance or Complaints:

- College of Education Instructional Technology Center: 859-257-7967 (☎)

- Information Technology Customer Service Center:

    - http://www.uky.edu/UKIT/Help/
    - 859-218-HELP (☎)

- Distance Learning programs for assistance: http://www.uky.edu/DistanceLearning

Attendance:

Students are expected to review and read all course materials in the week the materials are available. This includes having read assigned chapters of the text, course slides/notes/handouts, assigned journal articles and any other additional materials. There are situations when absences are excused and extensions are granted. See below for policy on excused absences. Students are also expected to attend class, complete homework assignments and participate in activities and discussions.

Excused Absences

Students need to notify the instructor of absences prior to class when possible. Senate Rule 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the instructor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754 (☎)). Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

Academic Integrity

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university, may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: http://www.uky.edu/Ombud. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Part II of Student Rights and Responsibilities (Available online at http://www.uky.edu/StudentAffairs/Code/part2.htm)

This provision states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, and is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of

plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.

Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them.

If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Accommodations for Disabled Students:

If you have a documented disability that requires academic accommodations in this course, please make your request to the University Disability Resource Center. The Center will require current disability documentation. When accommodations are approved, the Center will provide the instructor with a Letter of Accommodation which details the recommended accommodations. Contact the Disability Resource Center, Jake Karnes, Director at 859-257-2754 (☎) or jkarnes@email.uky.edu.

Commitment to Diversity:

Given the diverse world that we live in, students are asked to demonstrate a personal commitment to being knowledgeable, aware, and respectful of cultural diversity, culturally appropriate research, and how experiences (their own and others) of privilege and oppression impact interpersonal communication and social justice. Students are encouraged to challenge themselves to grow and change in ways that make themselves more culturally- and socially-competent learners. The course will be conducted with openness and respect to all individuals' points of view and experience. The activities and discussions will not tolerate discrimination or prejudice toward any person or group's religion, ethnicity, disability, gender, or sexual orientation.

TENTATIVE Course Schedule (Subject to change)

A summary of the topics to be covered is found in the following table. Please know that the instructor retains the right to modify this list of topics, if necessary, to better meet the learning objectives of this course. Changes to the topics will be discussed with students and provided in writing as an addendum distributed electronically via e-mail and posted on the course Blackboard.

Table 1: Tentative Schedule for Spring 2015 EDP/EPE 660 Distance Learning Section: RESEARCH DESIGN & ANALYSIS IN EDUCATION

Date	Topic(s)	Note	Chapters
Week 01	Course overview, SPSS tutorial		1 & 2
Week 02	Introduction to regression, and simple linear regression		2 & 3
Week 03	Simple linear regression: Probabilistic model and the OLS method		3
Week 04	Multiple regression: Probabilistic model, assumptions, estimation, model selection	HW 1 due	4
Week 05	Multiple regression: ANOVA & nested models; contrasts for categorical predictors		4 & 5
Week 06	Multiple regression: Polynomial models, regression when raw data are unavailable		4 & 5
Week 07	Subset selection: Stepwise, all possible subsets, information criteria		6
Week 08	Regression diagnostics: Collinearity	HW 2 due	7
Week 09	Regression diagnostics: Outliers and influential cases		8
Week 10	No class	Spring break	
Week 11	Regression diagnostics: Residuals and residual plots		8
Week 12	Classification: Logistic regression (logit model): exponential function, logit		9
Week 13	Classification: Logit model for a binary outcome (versus probit model)		9
Week 14	Classification: Logistic regression interpretation, accuracy, cross-validation		9
Week 15	Poisson regression: Count outcome, poisson distribution, logarithm function	HW 3 due	Course notes
Week 16	Poisson regression: Over-dispersion, versus negative binomial model		Course notes

EDP/EPE 660 Distance Learning Section

RESEARCH DESIGN AND ANALYSIS IN EDUCATION

Spring 2015: Distance Learning Section
Proposal filed in March, 2014

Instructor:

- Dr. Hongwei Yang, Assistant Professor

- 143B Taylor Education Building (TEB, located at 597 South Upper Street)

- E-mail: 1) patrick.yang@uky.edu (preferred method for reaching instructor, for course-related questions only) and 2) regressioncourseexams@gmail.com (backup plan for submission of homework, proposal, project paper, etc. given any planned/unplanned Blackboard outage)

- Office phone: 859-257-2330

- Campus office hours: By appointment

- Virtual office hours: By appointment

- Skype ID: edpepe660

Course Website:

- https://elearning.uky.edu/ or Blackboard

  - Login using your link blue username and password
  - Please check our course website (i.e., announcements and discussion boards) and your E-mail account daily for course information.

Course Format:

The course is an asynchronous on-line course and it is structured so that students can learn at their own pace. However, students are still required to meet the due dates outlined in the course schedule. Further, students also need to participate in online class discussions/forums, complete homework assignments, ask for help if they have questions, and stay on task. Typically, students need to do the following in order to stay on task:

- Complete required readings

- Review (lecture) notes (both audio and non audio PowerPoint (PPT) notes)

- Review SPSS video tutorials provided by the instructor for a given statistical analysis

- Respond to discussion board threads via Blackboard by posing questions and providing comments for a given topic

- Complete homework assignments and, if any, additional assigned readings on time

- Complete an end-of-semester project

Class Participation via Discussion Board Threads/Forums:

Due to the course format, schedule and content, participating in online discussion board threads is essential to your learning. Students are encouraged to participate in all class discussions via Blackboard. Although participation is not graded in this course, you are required to respond to online discussion board threads and engage in asynchronous dialogue with the course community. Ultimately, it is up to you to decide how you respond to the online discussions, but the more you participate the more you can learn from the course, the online community, and the instructor.

However, students missing in excess of one-fifth (20%) of class discussions on Blackboard will result in a denial of course credit and will be awarded a grade of W for the course. To ensure you do not receive a grade of W, you must provide complete and thoughtful responses to discussion board threads.

Discussion board threads/forums will be created in Blackboard. Students must respond to the discussion board thread (post) thoughtfully by mid-night (EST) of the posted due date in the course schedule/announcement after carefully reading materials pertinent to the discussion board thread.

Discussion Board threads/forums are available within the Blackboard course by clicking on the link labeled Discussions.

Group Forums:

If you would like, the instructor can create a form for those wanting to form study groups to learn together. Just E-mail the instructor with each student's name within the group. Just let me know how the instructor can help. The goal is for you to learn and not just get a grade. Forming learning groups is the best way to learn some of the topics in this course.

Posting of Grades:

All homework assignments (and other types of assessments, if any, at the discretion of the instructor) will be graded and returned to students. All homework scores will be posted on Blackboard in a timely manner so that students are aware of their progress in the course. Given an anticipated delay in grading the homework assignments and posting the grades, an announcement will be made in Blackboard.

Communication and Timeframe Expection:

The instructor will communicate on a regular basis via E-mail and Blackboard announcements. You will be expected to check your E-mail (and Blackboard) daily for course related updates and information. If you need to communicate with the instructor, please use the title **EDP/EPE660Online** in the subject line of your E-mail message. As for the maximum timeframe for responding to student communication, students may expect the instructor to have responses to E-mail, phone, and Blackboard inquiries within 48 hours excluding weekends.

Course Description:

EDP/EPE 660 is an applied, intermediate research methodology course that focuses on the regression aspect of general/generalized linear modeling. The course begins with general linear models with one or multiple model effects and relevant issues during the modeling process. Topics covered include model formulation, model estimation (ordinary least squares with/without bootstrapping, and maximum likelihood estimation), statistical inference and model interpretation (R^2 statistic, ANOVA table for nested model comparison, individual model parameter estimates, etc.). The course also discusses model evaluation and selection using information model selection criteria (AIC, CAIC, SBC, etc.) and nested model comparison (F test under the ordinary least squares estimation only). Contrast variable coding schemes (dummy indicators only) for categorical predictors (after a brief mention of an alternative approach to handling categorical variables under the framework of categorical regression that uses optimal scaling), moderation/interaction effects (versus mediation effects), and higher order effects in the context of polynomial regression are presented along with demonstrations on how to operationalize those terms in multiple ways in SPSS. Variable selection is discussed in the context of the stepwise method and the all-possible-subsets method. Regression diagnostics are the last issue examined under the general linear model framework which include the handling of

outlying cases and influential cases, the assessment of presence and intensity of collinear relations between predictors, and residual analysis for evaluating model assumptions. After wrapping up linear modeling, the course proceeds to generalized linear modeling where the focus is on the binary logistic regression model for supervised classification. Issues covered here parallel those under linear modeling: Model formulation (using probability/odds/logit of the target event), model estimation (maximum likelihood estimation), statistical inference, model interpretation, model evaluation and selection, nested model comparison using the likelihood ratio test, etc. As for model fit statistics, the course emphasizes the misclassification rate table which is a model evaluation and selection criterion unique to classification techniques. The topic of logistic regression is followed by that of Poisson regression. Here, the course focuses on the analysis of a count/frequency outcome. The course first introduces poisson distribution and then formulates the poisson regression model for analyzing a count outcome. The course also discusses statistical inference issues related to poisson regression before proceeding to a comparison of the poisson regression model with the negative binomial regression model. Finally, the course also provides a brief introduction of various extensions of the linear model to help students gain a better idea of follow-up quantitative courses to take:

- Multivariate model versus **univariate model** - EDP 707

- Random effects model versus **fixed effects model** - EDP/EPE 711 in Multilevel Analysis

- Correlated errors versus **uncorrelated errors** - Time series modeling and/or longitudinal data analysis (EDP/EPE 711 in Structural Equation Modeling (SEM) with an application in latent growth curve modeling (LGM) or EDP/EPE 711 in Multilevel Analysis)

- Non-normality of error versus **normality of error** - EDP/EPE 711 in Categorical Data Analysis using the SAS program

Course Outcomes:

1. Become familiar with various regression models, and understand how to identify the right model for the data

   - Understand two families of models: 1) General linear models, and 2) generalized linear models

2. Be able to formulate research question(s) under regression analysis, conduct the analysis, and interpret the results

3. Learn multiple SPSS Statistics procedures: REGRESSION, LINEAR, CURVEFIT, GENLIN, LOGISTIC REGRESSION, MULTIPLE IMPUTATION, etc.

4. Learn to program in SPSS Syntax Editor

Integration of Syllabus with UK College of Education Conceptual Framework:

This course addresses the four themes within the conceptual framework of the UK College of Education: Research, reflection, learning, and leading. Throughout the course, students take advantage of regression modeling to review, analyze, discuss, and apply research from diverse perspectives in education, including professional scholarship and practitioner inquiry. During the process, students reflect on their own practices as educators or future educators as they study, observe, and work in education. Reflection is integrated regularly through written communication to help students hone their analytical and problem-solving skills that comprise critical professional reflection on one's own practice. This course emphasizes the commitment of the UK College of Education to ensure that its graduates continue their professional careers equipped for life-long learning as educators actively leading colleagues in their schools, districts, and/or profession. The ultimate goal in addressing these four themes is to produce educational leaders who work together to improve student learning among diverse populations and improve education in Kentucky and beyond.

Expectations and How to Succeed in This Course:

In a regular course, students meet for about three hours of class time and are expected to devote two to three hours per week per credit outside of class time. Thus, a typical course consumes about 9 to 12 hours of your time per week over a 15 week semester. This course is constructed to meet these expectations! It is usually helpful to schedule blocks of time during each week for your participation in the course, much as you would if you were coming to campus for a class or meeting a study group for a beverage. It is not true that virtual/online courses require less time or effort than a face-to-face course! Be ready to learn!

Required Textbook:

- Mendenhall, W., & Sincich, T. (2011). *A second course in statistics: Regression analysis* (7th ed.). Upper Saddle River, NJ: Prentice Hall.

Recommending Reading:

- American Psychological Association. (2009). *Publication manual of the American Psychological Association* (6th ed.). Washington, DC: Author.

    – APA style guide for publication

- Azen, R., & Walker, C. M. (2011). *Categorical data analysis for the behavioral and social sciences.* NYC, NY: Routledge.

    – Extension of the linear model (discussed in this course) to cover non-continuous as well as continuous outcomes: Categorical, count, etc.

- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

    – Another classical text on this topic

- Field, A. (2013). *Discovering statistics using SPSS* (4th ed.). Thousand Oaks, CA: Sage.

    – Another classical text on this topic with a focus on the use of SPSS Statistics

- Fox, J. (2008). *Applied regression analysis and generalized linear models* (2nd ed.). Thousand Oaks, CA: Sage.

    – Written by social science researcher. Relatively technical. Useful for those interested in quantitative research

- Hox, J. J. (2010). *Multilevel analysis* (2nd ed.). NYC, NY: Routledge.

    – Extension of the general/generalized linear model to the general/generalized linear mixed model for multilevel cross-sectional and/or longitudinal data, a.k.a., hierarchical linear model (HLM), hierarchical generalized linear model, etc.

- Huck, S. (2011). *Reading statistics and research* (6th ed.). Boston, MA: Addison Wesley.

    – Useful for consumers of statistical information (including regression) from applied research

Additional Course Readings:

Additional readings related to course content will be assigned during the semester via E-mail, course announcements, or as listed in the course schedule. These additional course readings may include articles, cases, blogs, wikis, online resources, and videos. When such readings are required, they will be provided by the instructor in advance. Additional readings may be assigned throughout the course duration at the discretion of the instructor. Most required materials for this course are available on the blackboard site (https://elearning.uky.edu).

Prerequisite:

EDP/EPE 557 or an introductory statistics course. Specifically, the course assumes a knowledge of basic techniques of applied statistics, including normal distribution, confidence intervals, hypothesis tests (i.e., one and two-sample t-tests, etc.), basics of linear regression and analysis of variance (ANOVA).

Grading:

The course uses a letter grade that is based on the Graduate School Grade Scale. There will be 3 comprehensive homework assignments and a final course project (a two-page, double-space proposal is due during the semester). The project counts 25% of the final grade, and the remaining proportion (75%) is equally distributed across homework assignments.

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- The grading arrangement for this course is subject to change at the instructor's discretion after consulting with the students

Incomplete Grade:

Incomplete grades for this course are issued reluctantly and sparingly. The university permits students one calendar year-unless a shorter time frame is determined mutually by the student and instructor-to remove an "I" grade. If the contracted work is not completed satisfactorily, the "I" grade converts automatically to an "E" (a failing mark). UK rules require students requesting an "I" grade to complete a contract specifying how and when the "I" will be removed within the calendar year. The contract must be submitted to the course instructor before an "I" grade can be issued. Incomplete work and missing assessments will be assigned "E" grades if the student does not submit a completed Incomplete Grade Contract by the time the course ends.

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- Comprehensive Homework 1: This homework includes topics in correlation, hypothesis testing and simple linear regression. Students review several important topics from previous statistics courses: Correlation and statistical inference, in particular. Students conduct statistical inference in simple linear regression. Students interpret the R^2 statistic of an estimated regression model.

- Comprehensive Homework 2: This homework revolves around issues in multiple linear regression. Students conduct statistical inference in multiple linear regression and interpret model parameter estimates. Students apply nonlinear and/or interaction terms in a multiple linear regression model and properly interpret such terms. Students also learn to use a hierarchical approach to regression modeling. Finally, students use common model fit statistics to evaluate model fit.

- Comprehensive Homework 3: This homework deals with topics in generalized linear modeling: Binomial logistic regression model, in particular. Students specify and estimate logistic regression models in a hierarchical way. Students interpret the hierarchy of models in terms of logit of the target event and/or odds of the target event. Students conduct statistical inference in logistic regression modeling and assess the goodness-of-fit of each model.

End-of-Semester Project:

For the end-of-semester project, a project proposal is required and is due on or before the first Monday after the university spring break of the semester. In the proposal, please describe the data set and the questions that you plan to answer with it. The data description should be clear and complete, covering such things as 1) your outcome variable (DV), 2) your predictors (IV's), 3) what the relationship should be between the DV and the IV's based on the existing literature, the experts' opinions, and/or your own hypothesis, 4) what it is that you would like to find support for/against from the analysis of the data using the selected type of regression model that you plan to build, etc. Please limit the length of the proposal to two double-space pages, excluding references, figures, and/or tables, if any.

The project could be any topic that implements regression analysis. Given the three types of regression models that we plan to primarily cover: 1) Linear regression model (simple/multiple), 2) binary logistic regression model, and 3) poisson regression model, you could find an interested data set for analysis that uses any of the three types of models. The data set could come from any of these sources: 1) Online database (say, TIMSS, NAEP, PISA, etc.), 2) data that you collected, and 3) data from another paper (preferably from a peer-reviewed journal article in education or psychology). You can choose to replicate or cross-validate the results of a regression analysis in a peer-reviewed journal article. Given such a choice, you should state so at the beginning of the project (with full citation information of the article included) and also explain what it is that motivates you to replicate or cross-validate the research. You should also conduct your own regression analysis and present the output from your own analysis instead of using the existing information (tables, graphs, etc.) from the article. For one reason or another, it is not uncommon that the published results from a journal article just cannot be replicated even if you have followed exactly the same steps using exactly the same data set under exactly the same family of models. In that case, you need to acknowledge at the end of the project that you have failed to replicate their published results. Remember that you do not need to have access to the raw data to run a regression analysis. Many times, a summary of the raw data (a correlation matrix along with standard deviations, sample sizes, and means for all variables) is all you need to specify and estimate regression models. In many published articles, such information is typically made available by the author(s).

As for the process of regression analysis after the data set is already selected, previous students of the course usually ran a stepwise regression to select important predictors first and then, with selected predictors, constructed and tested one or two interaction (a.k.a., moderation) effects that they hypothesized might exist. They concluded with a summary of findings from the model finally selected and fitted. Of course, the entire analysis should be based on a correct choice of the type of regression model (general linear, generalized linear, etc.) for the selected data set.

More specifics about the project paper are listed below:

1. Submission of project paper: Microsoft Word document submitted electronically through Blackboard

2. Length of project paper: 20 to 25 pages

3. Language, style, and format: Publication Manual of the American Psychological Association (6th ed., 2009)

4. Submission of project paper by: 5:00 PM (EST) on May 08, 2015

Software Package:

SPSS Statistics 22 will be used extensively in the class. The program is available for download at `https://download.uky.edu/`, and it is available for both PC and Mac computers. After the program is downloaded, you will need to finish a brief online survey to have the license code sent to your UKY E-mail account electronically. In addition, SPSS Statistics is housed at a variety of locations on campus, including the university computer labs, the College of Education ITC labs, the Education Library, etc. To get a list of lab hours, please visit `http://www.uky.edu/ukit/labs/hours` and `http://education.uky.edu/ITC/`. Students are welcome to use other statistics programs as well, such as R, SAS, or JMP. But I will not provide any technical support for the use of such programs.

- Some of you may still have earlier versions of SPSS installed on your computer. It is acceptable for this course. However, I encourage you to replace the older program with its latest version because of the new features (and updates, as well) that have recently been added to it

- SPSS Statistics 22 documentation: `http://www-01.ibm.com/support/docview.wss?uid=swg27038407`

- SPSS AMOS 22 documentation: `http://www-01.ibm.com/support/docview.wss?uid=swg27038441`

SPSS Statistics Procedures Covered in EDP/EPE 660:

- Data handling: DESCRIPTIVES, EXAMINE, AGGREGATE, COMPUTE, MATRIX, MULTIPLE IMPUTATION, RMV, RESTRUCTURE DATA, SCORING WIZARD, etc.

- For linear regression: REGRESSION, LINEAR, CURVEFIT, and GENLIN

- For logistic regression: LOGISTIC REGRESSION, PROBIT, and GENLIN

- For poisson regression: GENLIN

Required Instructional Technology:

This course requires use of information technology. Students are expected to have regular access to a personal computer with audio capabilities, the Internet to complete their learning activities, Microsoft Word, PowerPoint, and Excel, Adobe Reader, and a high quality webcam and headset to complete their learning activities. All Web-based activities are to be completed within designated sections of the course site (e.g., Blackboard, google document).

All materials (slides, notes, assignments, data sets, SPSS syntax/script/macro files, etc.) for this course will be posted on Blackboard (`https://elearning.uky.edu`). Additional course readings, materials, and/or handouts will be provided by the instructor as needed.

Teaching and Academic Support:

- Contact the Teaching and Academic Support Center at `http://www.uky.edu.TASC/index.phpr` or 859-257-8772 (☎)

Procedures to Resolve Technical Problems:

- Contact the Information Technology Customer Service Center at `http://www.uky.edu/UKIT/` or 859-257-1300 (☎)

Information on Distance Learning Library Services:

- http://www.uky.edu/Libraries/DLLS
- Carla Cantagallo, DL Librarian
- Local phone number: 859-257-0500, ext. 2171
- Long-distance phone number: (800) 828-0439 (option #6)
- Email: dllservice@email.uky.edu
- DL Interlibrary Loan Service: http://www.uky.edu/Libraries/libpage.php?lweb_id=253&llib_id=16

Student Menu of Blackboard Support:

- http://wiki.uky.edu/blackboard/Wiki%20Pages/Home.aspx.
- Local phone number: (859) 257-1300
- Email: helpdesk@uky.edu

Other Technical Assistance or Complaints:

- College of Education Instructional Technology Center: 859-257-7967 (☎)
- Information Technology Customer Service Center:
    - http://www.uky.edu/UKIT/Help/
    - 859-218-HELP (☎)
- Distance Learning programs for assistance: http://www.uky.edu/DistanceLearning

Attendance:

Students are expected to review and read all course materials in the week the materials are available. This includes having read assigned chapters of the text, course slides/notes/handouts, assigned journal articles and any other additional materials. There are situations when absences are excused and extensions are granted. See below for policy on excused absences. Students are also expected to attend class, complete homework assignments and participate in activities and discussions.

Excused Absences

Students need to notify the instructor of absences prior to class when possible. Senate Rule 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the instructor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754 (☎)). Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

Academic Integrity

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university, may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: http://www.uky.edu/Ombud. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

> Part II of Student Rights and Responsibilities (Available online at http://www.uky.edu/StudentAffairs/Code/part2.htm)
>
> This provision states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, and is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.
>
> When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.
>
> Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them.
>
> If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Accommodations for Disabled Students:

If you have a documented disability that requires academic accommodations in this course, please make your request to the University Disability Resource Center. The Center will require current disability documentation. When accommodations are approved, the Center will provide the instructor with a Letter of Accommodation which details the recommended accommodations. Contact the Disability Resource Center, Jake Karnes, Director at 859-257-2754 (☎) or jkarnes@email.uky.edu.

Commitment to Diversity:

Given the diverse world that we live in, students are asked to demonstrate a personal commitment to being knowledgeable, aware, and respectful of cultural diversity, culturally appropriate research, and how experiences (their own and others) of privilege and oppression impact interpersonal communication and social justice. Students are encouraged to challenge themselves to grow and change in ways that make themselves more culturally- and socially-competent learners. The course will be conducted with openness and respect to all individuals' points of view and experience. The activities and discussions will not tolerate discrimination or prejudice toward any person or group's religion, ethnicity, disability, gender, or sexual orientation.

TENTATIVE Course Schedule (Subject to change)

A summary of the topics to be covered is found in the following table. Please know that the instructor retains the right to modify this list of topics, if necessary, to better meet the learning objectives of this course. Changes to the topics will be discussed with students and provided in writing as an addendum distributed electronically via e-mail and posted on the course Blackboard.

Table 1: Tentative Schedule for Spring 2015 EDP/EPE 660 Distance Learning Section: RESEARCH DESIGN & ANALYSIS IN EDUCATION

Date	Topic(s)	Note	Chapters
Week 01	Course overview, SPSS tutorial		1 & 2
Week 02	Introduction to regression, and simple linear regression		2 & 3
Week 03	Simple linear regression: Probabilistic model and the OLS method		3
Week 04	Multiple regression: Probabilistic model, assumptions, estimation, model selection	HW 1 due	4
Week 05	Multiple regression: ANOVA & nested models; contrasts for categorical predictors		4 & 5
Week 06	Multiple regression: Polynomial models, regression when raw data are unavailable		4 & 5
Week 07	Subset selection: Stepwise, all possible subsets, information criteria		6
Week 08	Regression diagnostics: Collinearity	HW 2 due	7
Week 09	Regression diagnostics: Outliers and influential cases		8
Week 10	No class	Spring break	
Week 11	Regression diagnostics: Residuals and residual plots		8
Week 12	Classification: Logistic regression (logit model): exponential function, logit		9
Week 13	Classification: Logit model for a binary outcome (versus probit model)		9
Week 14	Classification: Logistic regression interpretation, accuracy, cross-validation		9
Week 15	Poisson regression: Count outcome, poisson distribution, logarithm function	HW 3 due	Course notes
Week 16	Poisson regression: Over-dispersion, versus negative binomial model		Course notes

EDP/EPE 660 Distance Learning Section

RESEARCH DESIGN AND ANALYSIS IN EDUCATION

Instructor:

- Dr. Hongwei Yang, Assistant Professor

- 143B Taylor Education Building (TEB, located at 597 South Upper Street)

- E-mail: 1) patrick.yang@uky.edu (preferred method for reaching instructor, for course-related questions only) and 2) regressioncourseexams@gmail.com (backup plan for submission of homework, proposal, project paper, etc. given any planned/unplanned Blackboard outage)

- Office phone: 859-257-2330

- Campus office hours: By appointment

- Virtual office hours: By appointment

- Skype ID: edpepe660

Course Website:

- https://elearning.uky.edu/ or Blackboard

  - Login using your link blue username and password
  - Please check our course website (i.e., announcements and discussion boards) and your E-mail account daily for course information.

Course Format:

The course is an asynchronous on-line course and it is structured so that students can learn at their own pace. However, students are still required to meet the due dates outlined in the course schedule. Further, students also need to participate in online class discussions/forums, complete homework assignments, ask for help if they have questions, and stay on task. Typically, students need to do the following in order to stay on task:

- Complete required readings

- Review (lecture) notes (both audio and non audio PowerPoint (PPT) notes)

- Review SPSS video tutorials provided by the instructor for a given statistical analysis

- Respond to discussion board threads via Blackboard by posing questions and providing comments for a given topic

- Complete homework assignments and, if any, additional assigned readings on time

- Complete an end-of-semester project

Class Participation via Discussion Board Threads/Forums:

Due to the course format, schedule and content, participating in online discussion board threads is essential to your learning. Students are encouraged to participate in all class discussions via Blackboard. Although participation is not graded in this course, you are required to respond to online discussion board threads and engage in asynchronous dialogue with the course community. Ultimately, it is up to you to decide how you respond to the online discussions, but the more you participate the more you can learn from the course, the online community, and the instructor.

However, students missing in excess of one-fifth (20%) of class discussions on Blackboard will result in a denial of course credit and will be awarded a grade of W for the course. To ensure you do not receive a grade of W, you must provide complete and thoughtful responses to discussion board threads.

Discussion board threads/forums will be created in Blackboard. Students must respond to the discussion board thread (post) thoughtfully by mid-night (EST) of the posted due date in the course schedule/announcement after carefully reading materials pertinent to the discussion board thread.

Discussion Board threads/forums are available within the Blackboard course by clicking on the link labeled Discussions.

Group Forums:

If you would like, the instructor can create a form for those wanting to form study groups to learn together. Just E-mail the instructor with each student's name within the group. Just let me know how the instructor can help. The goal is for you to learn and not just get a grade. Forming learning groups is the best way to learn some of the topics in this course.

Posting of Grades:

All homework assignments (and other types of assessments, if any, at the discretion of the instructor) will be graded and returned to students. All homework scores will be posted on Blackboard in a timely manner so that students are aware of their progress in the course. Given an anticipated delay in grading the homework assignments and posting the grades, an announcement will be made in Blackboard.

Communication and Timeframe Expection:

The instructor will communicate on a regular basis via E-mail and Blackboard announcements. You will be expected to check your E-mail (and Blackboard) daily for course related updates and information. If you need to communicate with the instructor, please use the title **EDP/EPE660Online** in the subject line of your E-mail message. As for the maximum timeframe for responding to student communication, students may expect the instructor to have responses to E-mail, phone, and Blackboard inquiries within 48 hours excluding weekends.

Course Description:

EDP/EPE 660 is an applied, intermediate research methodology course that focuses on the regression aspect of general/generalized linear modeling. The course begins with general linear models with one or multiple model effects and relevant issues during the modeling process. Topics covered include model formulation, model estimation (ordinary least squares with/without bootstrapping, and maximum likelihood estimation), statistical inference and model interpretation (R^2 statistic, ANOVA table for nested model comparison, individual model parameter estimates, etc.). The course also discusses model evaluation and selection using information model selection criteria (AIC, CAIC, SBC, etc.) and nested model comparison (F test under the ordinary least squares estimation only). Contrast variable coding schemes (dummy indicators only) for categorical predictors (after a brief mention of an alternative approach to handling categorical variables under the framework of categorical regression that uses optimal scaling), moderation/interaction effects (versus mediation effects), and higher order effects in the context of polynomial regression are presented along with demonstrations on how to operationalize those terms in multiple ways in SPSS. Variable selection is discussed in the context of the stepwise method and the all-possible-subsets method. Regression diagnostics are the last issue examined under the general linear model framework which include the handling of

outlying cases and influential cases, the assessment of presence and intensity of collinear relations between predictors, and residual analysis for evaluating model assumptions. After wrapping up linear modeling, the course proceeds to generalized linear modeling where the focus is on the binary logistic regression model for supervised classification. Issues covered here parallel those under linear modeling: Model formulation (using probability/odds/logit of the target event), model estimation (maximum likelihood estimation), statistical inference, model interpretation, model evaluation and selection, nested model comparison using the likelihood ratio test, etc. As for model fit statistics, the course emphasizes the misclassification rate table which is a model evaluation and selection criterion unique to classification techniques. The topic of logistic regression is followed by that of Poisson regression. Here, the course focuses on the analysis of a count/frequency outcome. The course first introduces poisson distribution and then formulates the poisson regression model for analyzing a count outcome. The course also discusses statistical inference issues related to poisson regression before proceeding to a comparison of the poisson regression model with the negative binomial regression model. Finally, the course also provides a brief introduction of various extensions of the linear model to help students gain a better idea of follow-up quantitative courses to take:

- Multivariate model versus **univariate model** - EDP 707

- Random effects model versus **fixed effects model** - EDP/EPE 711 in Multilevel Analysis

- Correlated errors versus **uncorrelated errors** - Time series modeling and/or longitudinal data analysis (EDP/EPE 711 in Structural Equation Modeling (SEM) with an application in latent growth curve modeling (LGM) or EDP/EPE 711 in Multilevel Analysis)

- Non-normality of error versus **normality of error** - EDP/EPE 711 in Categorical Data Analysis using the SAS program

Course Outcomes:

1. Become familiar with various regression models, and understand how to identify the right model for the data

   - Understand two families of models: 1) General linear models, and 2) generalized linear models

2. Be able to formulate research question(s) under regression analysis, conduct the analysis, and interpret the results

3. Learn multiple SPSS Statistics procedures: REGRESSION, LINEAR, CURVEFIT, GENLIN, LOGISTIC REGRESSION, MULTIPLE IMPUTATION, etc.

4. Learn to program in SPSS Syntax Editor

Integration of Syllabus with UK College of Education Conceptual Framework:

This course addresses the four themes within the conceptual framework of the UK College of Education: Research, reflection, learning, and leading. Throughout the course, students take advantage of regression modeling to review, analyze, discuss, and apply research from diverse perspectives in education, including professional scholarship and practitioner inquiry. During the process, students reflect on their own practices as educators or future educators as they study, observe, and work in education. Reflection is integrated regularly through written communication to help students hone their analytical and problem-solving skills that comprise critical professional reflection on one's own practice. This course emphasizes the commitment of the UK College of Education to ensure that its graduates continue their professional careers equipped for life-long learning as educators actively leading colleagues in their schools, districts, and/or profession. The ultimate goal in addressing these four themes is to produce educational leaders who work together to improve student learning among diverse populations and improve education in Kentucky and beyond.

Expectations and How to Succeed in This Course:

In a regular course, students meet for about three hours of class time and are expected to devote two to three hours per week per credit outside of class time. Thus, a typical course consumes about 9 to 12 hours of your time per week over a 15 week semester. This course is constructed to meet these expectations! It is usually helpful to schedule blocks of time during each week for your participation in the course, much as you would if you were coming to campus for a class or meeting a study group for a beverage. It is not true that virtual/online courses require less time or effort than a face-to-face course! Be ready to learn!

Required Textbook:

- Mendenhall, W., & Sincich, T. (2011). *A second course in statistics: Regression analysis* (7th ed.). Upper Saddle River, NJ: Prentice Hall.

Recommending Reading:

- American Psychological Association. (2009). *Publication manual of the American Psychological Association* (6th ed.). Washington, DC: Author.

  - APA style guide for publication

- Azen, R., & Walker, C. M. (2011). *Categorical data analysis for the behavioral and social sciences.* NYC, NY: Routledge.

  - Extension of the linear model (discussed in this course) to cover non-continuous as well as continuous outcomes: Categorical, count, etc.

- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

  - Another classical text on this topic

- Field, A. (2013). *Discovering statistics using SPSS* (4th ed.). Thousand Oaks, CA: Sage.

  - Another classical text on this topic with a focus on the use of SPSS Statistics

- Fox, J. (2008). *Applied regression analysis and generalized linear models* (2nd ed.). Thousand Oaks, CA: Sage.

  - Written by social science researcher. Relatively technical. Useful for those interested in quantitative research

- Hox, J. J. (2010). *Multilevel analysis* (2nd ed.). NYC, NY: Routledge.

  - Extension of the general/generalized linear model to the general/generalized linear mixed model for multilevel cross-sectional and/or longitudinal data, a.k.a., hierarchical linear model (HLM), hierarchical generalized linear model, etc.

- Huck, S. (2011). *Reading statistics and research* (6th ed.). Boston, MA: Addison Wesley.

  - Useful for consumers of statistical information (including regression) from applied research

Additional Course Readings:

Additional readings related to course content will be assigned during the semester via E-mail, course announcements, or as listed in the course schedule. These additional course readings may include articles, cases, blogs, wikis, online resources, and videos. When such readings are required, they will be provided by the instructor in advance. Additional readings may be assigned throughout the course duration at the discretion of the instructor. Most required materials for this course are available on the blackboard site (https://elearning.uky.edu).

Prerequisite:

EDP/EPE 557 or an introductory statistics course. Specifically, the course assumes a knowledge of basic techniques of applied statistics, including normal distribution, confidence intervals, hypothesis tests (i.e., one and two-sample t-tests, etc.), basics of linear regression and analysis of variance (ANOVA).

Grading:

The course uses a letter grade that is based on the Graduate School Grade Scale. There will be 3 comprehensive homework assignments and a final course project (a two-page, double-space proposal is due during the semester). The project counts 25% of the final grade, and the remaining proportion (75%) is equally distributed across homework assignments.

Given three homework assignments, they will count toward the final grade as follows:

Comprehensive Homework 1	25%
Comprehensive Homework 2	25%
Comprehensive Homework 3	25%
Course project (with proposal)	25%

- Course grades will be earned as follows: A (High Achievement): 90% and above; B (Good Achievement): 80%-89%; C (Minimum Passing Achievement): 70-79%; E (Unsatisfactory Achievement): 69% and below

- The grading arrangement for this course is subject to change at the instructor's discretion after consulting with the students

Incomplete Grade:

Incomplete grades for this course are issued reluctantly and sparingly. The university permits students one calendar year-unless a shorter time frame is determined mutually by the student and instructor-to remove an "I" grade. If the contracted work is not completed satisfactorily, the "I" grade converts automatically to an "E" (a failing mark). UK rules require students requesting an "I" grade to complete a contract specifying how and when the "I" will be removed within the calendar year. The contract must be submitted to the course instructor before an "I" grade can be issued. Incomplete work and missing assessments will be assigned "E" grades if the student does not submit a completed Incomplete Grade Contract by the time the course ends.

Homework Assignments:

For comprehensive homework assignments (and, if any, additional assigned readings, discussion board participation, related course activities, etc.), it is mandatory for students to complete all of them. Homework assignments (with instructions) are all distributed electronically to the class through Blackboard and E-mail. Students are usually given one week to finish each homework and a due date is provided on the course schedule with regard to each individual assignment. All assignments are due by 11:59:59 PM Eastern Standard Time (EST) on the due date specified in the course schedule and are to be submitted through Blackboard using the last 4 digits of your UK student identification number. The due date is always the last day of the week (i.e., Saturday) indicated in the course schedule. In order to achieve and maintain sufficient progress in this web-based course, it is necessary to complete and submit assignments (and class activities, if any) by the due date indicated. The submission window will close for each respective assignment after the due date indicated. Failure to submit an assignment by the due date could result in a failing grade for the assignment unless prior arrangements are made with the course instructor.

Acceptance of late assignments is at the discretion of the course instructor. Acceptable reasons for excused absences/late assignments are listed in Student Rights and Responsibilities (Senate Rule 5.2.4.2, details to be provided later in the syllabus). Most of the time, exceptions will be made **ONLY** in extreme circumstances, such as (but are not limited to) an incapacitating illness or injury, or a death in the family. Since the course materials are posted on Blackboard, events such as (but are not limited to) vacation/travel plans, social obligations, or family gatherings do not constitute exceptions. According to university guidelines, students are allowed an excused absence for specified reasons. The burden of proof is on the student; sufficient documentation may be required. A brief description of each homework is provided below:

- Comprehensive Homework 1: This homework includes topics in correlation, hypothesis testing and simple linear regression. Students review several important topics from previous statistics courses: Correlation and statistical inference, in particular. Students conduct statistical inference in simple linear regression. Students interpret the R^2 statistic of an estimated regression model.

- Comprehensive Homework 2: This homework revolves around issues in multiple linear regression. Students conduct statistical inference in multiple linear regression and interpret model parameter estimates. Students apply nonlinear and/or interaction terms in a multiple linear regression model and properly interpret such terms. Students also learn to use a hierarchical approach to regression modeling. Finally, students use common model fit statistics to evaluate model fit.

- Comprehensive Homework 3: This homework deals with topics in generalized linear modeling: Binomial logistic regression model, in particular. Students specify and estimate logistic regression models in a hierarchical way. Students interpret the hierarchy of models in terms of logit of the target event and/or odds of the target event. Students conduct statistical inference in logistic regression modeling and assess the goodness-of-fit of each model.

End-of-Semester Project:

For the end-of-semester project, a project proposal is required and is due on or before the first Monday after the university spring break of the semester. In the proposal, please describe the data set and the questions that you plan to answer with it. The data description should be clear and complete, covering such things as 1) your outcome variable (DV), 2) your predictors (IV's), 3) what the relationship should be between the DV and the IV's based on the existing literature, the experts' opinions, and/or your own hypothesis, 4) what it is that you would like to find support for/against from the analysis of the data using the selected type of regression model that you plan to build, etc. Please limit the length of the proposal to two double-space pages, excluding references, figures, and/or tables, if any.

The project could be any topic that implements regression analysis. Given the three types of regression models that we plan to primarily cover: 1) Linear regression model (simple/multiple), 2) binary logistic regression model, and 3) poisson regression model, you could find an interested data set for analysis that uses any of the three types of models. The data set could come from any of these sources: 1) Online database (say, TIMSS, NAEP, PISA, etc.), 2) data that you collected, and 3) data from another paper (preferably from a peer-reviewed journal article in education or psychology). You can choose to replicate or cross-validate the results of a regression analysis in a peer-reviewed journal article. Given such a choice, you should state so at the beginning of the project (with full citation information of the article included) and also explain what it is that motivates you to replicate or cross-validate the research. You should also conduct your own regression analysis and present the output from your own analysis instead of using the existing information (tables, graphs, etc.) from the article. For one reason or another, it is not uncommon that the published results from a journal article just cannot be replicated even if you have followed exactly the same steps using exactly the same data set under exactly the same family of models. In that case, you need to acknowledge at the end of the project that you have failed to replicate their published results. Remember that you do not need to have access to the raw data to run a regression analysis. Many times, a summary of the raw data (a correlation matrix along with standard deviations, sample sizes, and means for all variables) is all you need to specify and estimate regression models. In many published articles, such information is typically made available by the author(s).

As for the process of regression analysis after the data set is already selected, previous students of the course usually ran a stepwise regression to select important predictors first and then, with selected predictors, constructed and tested one or two interaction (a.k.a., moderation) effects that they hypothesized might exist. They concluded with a summary of findings from the model finally selected and fitted. Of course, the entire analysis should be based on a correct choice of the type of regression model (general linear, generalized linear, etc.) for the selected data set.

More specifics about the project paper are listed below:

1. Submission of project paper: Microsoft Word document submitted electronically through Blackboard

2. Length of project paper: 20 to 25 pages

3. Language, style, and format: Publication Manual of the American Psychological Association (6th ed., 2009)

4. Submission of project paper by: 5:00 PM (EST) on May 08, 2015

Software Package:

SPSS Statistics 22 will be used extensively in the class. The program is available for download at https://download.uky.edu/, and it is available for both PC and Mac computers. After the program is downloaded, you will need to finish a brief online survey to have the license code sent to your UKY E-mail account electronically. In addition, SPSS Statistics is housed at a variety of locations on campus, including the university computer labs, the College of Education ITC labs, the Education Library, etc. To get a list of lab hours, please visit http://www.uky.edu/ukit/labs/hours and http://education.uky.edu/ITC/. Students are welcome to use other statistics programs as well, such as R, SAS, or JMP. But I will not provide any technical support for the use of such programs.

- Some of you may still have earlier versions of SPSS installed on your computer. It is acceptable for this course. However, I encourage you to replace the older program with its latest version because of the new features (and updates, as well) that have recently been added to it

- SPSS Statistics 22 documentation: http://www-01.ibm.com/support/docview.wss?uid=swg27038407

- SPSS AMOS 22 documentation: http://www-01.ibm.com/support/docview.wss?uid=swg27038441

SPSS Statistics Procedures Covered in EDP/EPE 660:

- Data handling: DESCRIPTIVES, EXAMINE, AGGREGATE, COMPUTE, MATRIX, MULTIPLE IMPUTATION, RMV, RESTRUCTURE DATA, SCORING WIZARD, etc.

- For linear regression: REGRESSION, LINEAR, CURVEFIT, and GENLIN

- For logistic regression: LOGISTIC REGRESSION, PROBIT, and GENLIN

- For poisson regression: GENLIN

Required Instructional Technology:

This course requires use of information technology. Students are expected to have regular access to a personal computer with audio capabilities, the Internet to complete their learning activities, Microsoft Word, PowerPoint, and Excel, Adobe Reader, and a high quality webcam and headset to complete their learning activities. All Web-based activities are to be completed within designated sections of the course site (e.g., Blackboard, google document).

All materials (slides, notes, assignments, data sets, SPSS syntax/script/macro files, etc.) for this course will be posted on Blackboard (https://elearning.uky.edu). Additional course readings, materials, and/or handouts will be provided by the instructor as needed.

Teaching and Academic Support:

- Contact the Teaching and Academic Support Center at http://www.uky.edu.TASC/index.phpr or 859-257-8772 (☎)

Procedures to Resolve Technical Problems:

- Contact the Information Technology Customer Service Center at http://www.uky.edu/UKIT/ or 859-257-1300 (☎)

Information on Distance Learning Library Services:

- http://www.uky.edu/Libraries/DLLS
- Carla Cantagallo, DL Librarian
- Local phone number: 859-257-0500, ext. 2171
- Long-distance phone number: (800) 828-0439 (option #6)
- Email: dllservice@email.uky.edu
- DL Interlibrary Loan Service: http://www.uky.edu/Libraries/libpage.php?lweb_id=253&llib_id=16

Student Menu of Blackboard Support:

- http://wiki.uky.edu/blackboard/Wiki%20Pages/Home.aspx.
- Local phone number: (859) 257-1300
- Email: helpdesk@uky.edu

Other Technical Assistance or Complaints:

- College of Education Instructional Technology Center: 859-257-7967 (☎)
- Information Technology Customer Service Center:
  - http://www.uky.edu/UKIT/Help/
  - 859-218-HELP (☎)
- Distance Learning programs for assistance: http://www.uky.edu/DistanceLearning

Attendance:

Students are expected to review and read all course materials in the week the materials are available. This includes having read assigned chapters of the text, course slides/notes/handouts, assigned journal articles and any other additional materials. There are situations when absences are excused and extensions are granted. See below for policy on excused absences. Students are also expected to attend class, complete homework assignments and participate in activities and discussions.

Excused Absences

Students need to notify the instructor of absences prior to class when possible. Senate Rule 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the instructor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754 (☎)). Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

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Academic Integrity

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university, may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: http://www.uky.edu/Ombud. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

> Part II of Student Rights and Responsibilities (Available online at http://www.uky.edu/StudentAffairs/Code/part2.htm)
>
> This provision states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, and is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.
>
> When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.
>
> Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them.
>
> If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Accommodations for Disabled Students:

If you have a documented disability that requires academic accommodations in this course, please make your request to the University Disability Resource Center. The Center will require current disability documentation. When accommodations are approved, the Center will provide the instructor with a Letter of Accommodation which details the recommended accommodations. Contact the Disability Resource Center, Jake Karnes, Director at 859-257-2754 (☎) or jkarnes@email.uky.edu.

Commitment to Diversity:

Given the diverse world that we live in, students are asked to demonstrate a personal commitment to being knowledgeable, aware, and respectful of cultural diversity, culturally appropriate research, and how experiences (their own and others) of privilege and oppression impact interpersonal communication and social justice. Students are encouraged to challenge themselves to grow and change in ways that make themselves more culturally- and socially-competent learners. The course will be conducted with openness and respect to all individuals' points of view and experience. The activities and discussions will not tolerate discrimination or prejudice toward any person or group's religion, ethnicity, disability, gender, or sexual orientation.

TENTATIVE Course Schedule (Subject to change)

A summary of the topics to be covered is found in the following table. Please know that the instructor retains the right to modify this list of topics, if necessary, to better meet the learning objectives of this course. Changes to the topics will be discussed with students and provided in writing as an addendum distributed electronically via e-mail and posted on the course Blackboard.

Table 1: Tentative Schedule for Spring 2015 EDP/EPE 660 Distance Learning Section: RESEARCH DESIGN & ANALYSIS IN EDUCATION

Date	Topic(s)	Note	Chapters
Week 01	Course overview, SPSS tutorial		1 & 2
Week 02	Introduction to regression, and simple linear regression		2 & 3
Week 03	Simple linear regression: Probabilistic model and the OLS method		3
Week 04	Multiple regression: Probabilistic model, assumptions, estimation, model selection	HW 1 due	4
Week 05	Multiple regression: ANOVA & nested models; contrasts for categorical predictors		4 & 5
Week 06	Multiple regression: Polynomial models, regression when raw data are unavailable		4 & 5
Week 07	Subset selection: Stepwise, all possible subsets, information criteria		6
Week 08	Regression diagnostics: Collinearity	HW 2 due	7
Week 09	Regression diagnostics: Outliers and influential cases		8
Week 10	No class	Spring break	
Week 11	Regression diagnostics: Residuals and residual plots		8
Week 12	Classification: Logistic regression (logit model); exponential function, logit		9
Week 13	Classification: Logit model for a binary outcome (versus probit model)		9
Week 14	Classification: Logistic regression interpretation, accuracy, cross-validation		9
Week 15	Poisson regression: Count outcome, poisson distribution, logarithm function	HW 3 due	Course notes
Week 16	Poisson regression: Over-dispersion, versus negative binomial model		Course notes

EDP/EPE 660 Distance Learning Section

RESEARCH DESIGN AND ANALYSIS IN EDUCATION

Spring 2015: Distance Learning Section
Proposal filed in March, 2014

Instructor:

- Dr. Hongwei Yang, Assistant Professor

- 143B Taylor Education Building (TEB, located at 597 South Upper Street)

- E-mail: 1) patrick.yang@uky.edu (preferred method for reaching instructor, for course-related questions only) and 2) regressioncourseexams@gmail.com (backup plan for submission of homework, proposal, project paper, etc. given any planned/unplanned Blackboard outage)

- Office phone: 859-257-2330

- Campus office hours: By appointment

- Virtual office hours: By appointment

- Skype ID: edpepe660

Course Website:

- https://elearning.uky.edu/ or Blackboard

  - Login using your link blue username and password
  - Please check our course website (i.e., announcements and discussion boards) and your E-mail account daily for course information.

Course Format:

The course is an asynchronous on-line course and it is structured so that students can learn at their own pace. However, students are still required to meet the due dates outlined in the course schedule. Further, students also need to participate in online class discussions/forums, complete homework assignments, ask for help if they have questions, and stay on task. Typically, students need to do the following in order to stay on task:

- Complete required readings

- Review (lecture) notes (both audio and non audio PowerPoint (PPT) notes)

- Review SPSS video tutorials provided by the instructor for a given statistical analysis

- Respond to discussion board threads via Blackboard by posing questions and providing comments for a given topic

- Complete homework assignments and, if any, additional assigned readings on time

- Complete an end-of-semester project

Class Participation via Discussion Board Threads/Forums:

Due to the course format, schedule and content, participating in online discussion board threads is essential to your learning. Students are encouraged to participate in all class discussions via Blackboard. Although participation is not graded in this course, you are required to respond to online discussion board threads and engage in asynchronous dialogue with the course community. Ultimately, it is up to you to decide how you respond to the online discussions, but the more you participate the more you can learn from the course, the online community, and the instructor.

However, students missing in excess of one-fifth (20%) of class discussions on Blackboard will result in a denial of course credit and will be awarded a grade of W for the course. To ensure you do not receive a grade of W, you must provide complete and thoughtful responses to discussion board threads.

Discussion board threads/forums will be created in Blackboard. Students must respond to the discussion board thread (post) thoughtfully by mid-night (EST) of the posted due date in the course schedule/announcement after carefully reading materials pertinent to the discussion board thread.

Discussion Board threads/forums are available within the Blackboard course by clicking on the link labeled Discussions.

Group Forums:

If you would like, the instructor can create a form for those wanting to form study groups to learn together. Just E-mail the instructor with each student's name within the group. Just let me know how the instructor can help. The goal is for you to learn and not just get a grade. Forming learning groups is the best way to learn some of the topics in this course.

Posting of Grades:

All homework assignments (and other types of assessments, if any, at the discretion of the instructor) will be graded and returned to students. All homework scores will be posted on Blackboard in a timely manner so that students are aware of their progress in the course. Given an anticipated delay in grading the homework assignments and posting the grades, an announcement will be made in Blackboard.

Communication and Timeframe Expection:

The instructor will communicate on a regular basis via E-mail and Blackboard announcements. You will be expected to check your E-mail (and Blackboard) daily for course related updates and information. If you need to communicate with the instructor, please use the title **EDP/EPE660Online** in the subject line of your E-mail message. As for the maximum timeframe for responding to student communication, students may expect the instructor to have responses to E-mail, phone, and Blackboard inquiries within 48 hours excluding weekends.

Course Description:

EDP/EPE 660 is an applied, intermediate research methodology course that focuses on the regression aspect of general/generalized linear modeling. The course begins with general linear models with one or multiple model effects and relevant issues during the modeling process. Topics covered include model formulation, model estimation (ordinary least squares with/without bootstrapping, and maximum likelihood estimation), statistical inference and model interpretation (R^2 statistic, ANOVA table for nested model comparison, individual model parameter estimates, etc.). The course also discusses model evaluation and selection using information model selection criteria (AIC, CAIC, SBC, etc.) and nested model comparison (F test under the ordinary least squares estimation only). Contrast variable coding schemes (dummy indicators only) for categorical predictors (after a brief mention of an alternative approach to handling categorical variables under the framework of categorical regression that uses optimal scaling), moderation/interaction effects (versus mediation effects), and higher order effects in the context of polynomial regression are presented along with demonstrations on how to operationalize those terms in multiple ways in SPSS. Variable selection is discussed in the context of the stepwise method and the all-possible-subsets method. Regression diagnostics are the last issue examined under the general linear model framework which include the handling of

outlying cases and influential cases, the assessment of presence and intensity of collinear relations between predictors, and residual analysis for evaluating model assumptions. After wrapping up linear modeling, the course proceeds to generalized linear modeling where the focus is on the binary logistic regression model for supervised classification. Issues covered here parallel those under linear modeling: Model formulation (using probability/odds/logit of the target event), model estimation (maximum likelihood estimation), statistical inference, model interpretation, model evaluation and selection, nested model comparison using the likelihood ratio test, etc. As for model fit statistics, the course emphasizes the misclassification rate table which is a model evaluation and selection criterion unique to classification techniques. The topic of logistic regression is followed by that of Poisson regression. Here, the course focuses on the analysis of a count/frequency outcome. The course first introduces poisson distribution and then formulates the poisson regression model for analyzing a count outcome. The course also discusses statistical inference issues related to poisson regression before proceeding to a comparison of the poisson regression model with the negative binomial regression model. Finally, the course also provides a brief introduction of various extensions of the linear model to help students gain a better idea of follow-up quantitative courses to take:

- Multivariate model versus **univariate model** - EDP 707

- Random effects model versus **fixed effects model** - EDP/EPE 711 in Multilevel Analysis

- Correlated errors versus **uncorrelated errors** - Time series modeling and/or longitudinal data analysis (EDP/EPE 711 in Structural Equation Modeling (SEM) with an application in latent growth curve modeling (LGM) or EDP/EPE 711 in Multilevel Analysis)

- Non-normality of error versus **normality of error** - EDP/EPE 711 in Categorical Data Analysis using the SAS program

Course Outcomes:

1. Become familiar with various regression models, and understand how to identify the right model for the data

   - Understand two families of models: 1) General linear models, and 2) generalized linear models

2. Be able to formulate research question(s) under regression analysis, conduct the analysis, and interpret the results

3. Learn multiple SPSS Statistics procedures: REGRESSION, LINEAR, CURVEFIT, GENLIN, LOGISTIC REGRESSION, MULTIPLE IMPUTATION, etc.

4. Learn to program in SPSS Syntax Editor

Integration of Syllabus with UK College of Education Conceptual Framework:

This course addresses the four themes within the conceptual framework of the UK College of Education: Research, reflection, learning, and leading. Throughout the course, students take advantage of regression modeling to review, analyze, discuss, and apply research from diverse perspectives in education, including professional scholarship and practitioner inquiry. During the process, students reflect on their own practices as educators or future educators as they study, observe, and work in education. Reflection is integrated regularly through written communication to help students hone their analytical and problem-solving skills that comprise critical professional reflection on one's own practice. This course emphasizes the commitment of the UK College of Education to ensure that its graduates continue their professional careers equipped for life-long learning as educators actively leading colleagues in their schools, districts, and/or profession. The ultimate goal in addressing these four themes is to produce educational leaders who work together to improve student learning among diverse populations and improve education in Kentucky and beyond.

Expectations and How to Succeed in This Course:

In a regular course, students meet for about three hours of class time and are expected to devote two to three hours per week per credit outside of class time. Thus, a typical course consumes about 9 to 12 hours of your time per week over a 15 week semester. This course is constructed to meet these expectations! It is usually helpful to schedule blocks of time during each week for your participation in the course, much as you would if you were coming to campus for a class or meeting a study group for a beverage. It is not true that virtual/online courses require less time or effort than a face-to-face course! Be ready to learn!

Required Textbook:

- Mendenhall, W., & Sincich, T. (2011). *A second course in statistics: Regression analysis* (7th ed.). Upper Saddle River, NJ: Prentice Hall.

Recommending Reading:

- American Psychological Association. (2009). *Publication manual of the American Psychological Association* (6th ed.). Washington, DC: Author.

    − APA style guide for publication

- Azen, R., & Walker, C. M. (2011). *Categorical data analysis for the behavioral and social sciences.* NYC, NY: Routledge.

    − Extension of the linear model (discussed in this course) to cover non-continuous as well as continuous outcomes: Categorical, count, etc.

- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

    − Another classical text on this topic

- Field, A. (2013). *Discovering statistics using SPSS* (4th ed.). Thousand Oaks, CA: Sage.

    − Another classical text on this topic with a focus on the use of SPSS Statistics

- Fox, J. (2008). *Applied regression analysis and generalized linear models* (2nd ed.). Thousand Oaks, CA: Sage.

    − Written by social science researcher. Relatively technical. Useful for those interested in quantitative research

- Hox, J. J. (2010). *Multilevel analysis* (2nd ed.). NYC, NY: Routledge.

    − Extension of the general/generalized linear model to the general/generalized linear mixed model for multilevel cross-sectional and/or longitudinal data, a.k.a., hierarchical linear model (HLM), hierarchical generalized linear model, etc.

- Huck, S. (2011). *Reading statistics and research* (6th ed.). Boston, MA: Addison Wesley.

    − Useful for consumers of statistical information (including regression) from applied research

Additional Course Readings:

Additional readings related to course content will be assigned during the semester via E-mail, course announcements, or as listed in the course schedule. These additional course readings may include articles, cases, blogs, wikis, online resources, and videos. When such readings are required, they will be provided by the instructor in advance. Additional readings may be assigned throughout the course duration at the discretion of the instructor. Most required materials for this course are available on the blackboard site (https://elearning.uky.edu).

Prerequisite:

EDP/EPE 557 or an introductory statistics course. Specifically, the course assumes a knowledge of basic techniques of applied statistics, including normal distribution, confidence intervals, hypothesis tests (i.e., one and two-sample t-tests, etc.), basics of linear regression and analysis of variance (ANOVA).

Grading:

The course uses a letter grade that is based on the Graduate School Grade Scale. There will be 3 comprehensive homework assignments and a final course project (a two-page, double-space proposal is due during the semester). The project counts 25% of the final grade, and the remaining proportion (75%) is equally distributed across homework assignments.

Given three homework assignments, they will count toward the final grade as follows:

Comprehensive Homework 1	25%
Comprehensive Homework 2	25%
Comprehensive Homework 3	25%
Course project (with proposal)	25%

- Course grades will be earned as follows: A (High Achievement): 90% and above; B (Good Achievement): 80%-89%; C (Minimum Passing Achievement): 70-79%; E (Unsatisfactory Achievement): 69% and below

- The grading arrangement for this course is subject to change at the instructor's discretion after consulting with the students

Incomplete Grade:

Incomplete grades for this course are issued reluctantly and sparingly. The university permits students one calendar year-unless a shorter time frame is determined mutually by the student and instructor-to remove an "I" grade. If the contracted work is not completed satisfactorily, the "I" grade converts automatically to an "E" (a failing mark). UK rules require students requesting an "I" grade to complete a contract specifying how and when the "I" will be removed within the calendar year. The contract must be submitted to the course instructor before an "I" grade can be issued. Incomplete work and missing assessments will be assigned "E" grades if the student does not submit a completed Incomplete Grade Contract by the time the course ends.

Homework Assignments:

For comprehensive homework assignments (and, if any, additional assigned readings, discussion board participation, related course activities, etc.), it is mandatory for students to complete all of them. Homework assignments (with instructions) are all distributed electronically to the class through Blackboard and E-mail. Students are usually given one week to finish each homework and a due date is provided on the course schedule with regard to each individual assignment. All assignments are due by 11:59:59 PM Eastern Standard Time (EST) on the due date specified in the course schedule and are to be submitted through Blackboard using the last 4 digits of your UK student identification number. The due date is always the last day of the week (i.e., Saturday) indicated in the course schedule. In order to achieve and maintain sufficient progress in this web-based course, it is necessary to complete and submit assignments (and class activities, if any) by the due date indicated. The submission window will close for each respective assignment after the due date indicated. Failure to submit an assignment by the due date could result in a failing grade for the assignment unless prior arrangements are made with the course instructor.

Acceptance of late assignments is at the discretion of the course instructor. Acceptable reasons for excused absences/late assignments are listed in Student Rights and Responsibilities (Senate Rule 5.2.4.2, details to be provided later in the syllabus). Most of the time, exceptions will be made **ONLY** in extreme circumstances, such as (but are not limited to) an incapacitating illness or injury, or a death in the family. Since the course materials are posted on Blackboard, events such as (but are not limited to) vacation/travel plans, social obligations, or family gatherings do not constitute exceptions. According to university guidelines, students are allowed an excused absence for specified reasons. The burden of proof is on the student; sufficient documentation may be required. A brief description of each homework is provided below:

- Comprehensive Homework 1: This homework includes topics in correlation, hypothesis testing and simple linear regression. Students review several important topics from previous statistics courses: Correlation and statistical inference, in particular. Students conduct statistical inference in simple linear regression. Students interpret the R^2 statistic of an estimated regression model.

- Comprehensive Homework 2: This homework revolves around issues in multiple linear regression. Students conduct statistical inference in multiple linear regression and interpret model parameter estimates. Students apply nonlinear and/or interaction terms in a multiple linear regression model and properly interpret such terms. Students also learn to use a hierarchical approach to regression modeling. Finally, students use common model fit statistics to evaluate model fit.

- Comprehensive Homework 3: This homework deals with topics in generalized linear modeling: Binomial logistic regression model, in particular. Students specify and estimate logistic regression models in a hierarchical way. Students interpret the hierarchy of models in terms of logit of the target event and/or odds of the target event. Students conduct statistical inference in logistic regression modeling and assess the goodness-of-fit of each model.

End-of-Semester Project:

For the end-of-semester project, a project proposal is required and is due on or before the first Monday after the university spring break of the semester. In the proposal, please describe the data set and the questions that you plan to answer with it. The data description should be clear and complete, covering such things as 1) your outcome variable (DV), 2) your predictors (IV's), 3) what the relationship should be between the DV and the IV's based on the existing literature, the experts' opinions, and/or your own hypothesis, 4) what it is that you would like to find support for/against from the analysis of the data using the selected type of regression model that you plan to build, etc. Please limit the length of the proposal to two double-space pages, excluding references, figures, and/or tables, if any.

The project could be any topic that implements regression analysis. Given the three types of regression models that we plan to primarily cover: 1) Linear regression model (simple/multiple), 2) binary logistic regression model, and 3) poisson regression model, you could find an interested data set for analysis that uses any of the three types of models. The data set could come from any of these sources: 1) Online database (say, TIMSS, NAEP, PISA, etc.), 2) data that you collected, and 3) data from another paper (preferably from a peer-reviewed journal article in education or psychology). You can choose to replicate or cross-validate the results of a regression analysis in a peer-reviewed journal article. Given such a choice, you should state so at the beginning of the project (with full citation information of the article included) and also explain what it is that motivates you to replicate or cross-validate the research. You should also conduct your own regression analysis and present the output from your own analysis instead of using the existing information (tables, graphs, etc.) from the article. For one reason or another, it is not uncommon that the published results from a journal article just cannot be replicated even if you have followed exactly the same steps using exactly the same data set under exactly the same family of models. In that case, you need to acknowledge at the end of the project that you have failed to replicate their published results. Remember that you do not need to have access to the raw data to run a regression analysis. Many times, a summary of the raw data (a correlation matrix along with standard deviations, sample sizes, and means for all variables) is all you need to specify and estimate regression models. In many published articles, such information is typically made available by the author(s).

As for the process of regression analysis after the data set is already selected, previous students of the course usually ran a stepwise regression to select important predictors first and then, with selected predictors, constructed and tested one or two interaction (a.k.a., moderation) effects that they hypothesized might exist. They concluded with a summary of findings from the model finally selected and fitted. Of course, the entire analysis should be based on a correct choice of the type of regression model (general linear, generalized linear, etc.) for the selected data set.

More specifics about the project paper are listed below:

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- Carla Cantagallo, DL Librarian
- Local phone number: 859-257-0500, ext. 2171
- Long-distance phone number: (800) 828-0439 (option #6)
- Email: dllservice@email.uky.edu
- DL Interlibrary Loan Service: http://www.uky.edu/Libraries/libpage.php?lweb_id=253&llib_id=16

Student Menu of Blackboard Support:

- http://wiki.uky.edu/blackboard/Wiki%20Pages/Home.aspx.
- Local phone number: (859) 257-1300
- Email: helpdesk@uky.edu

Other Technical Assistance or Complaints:

- College of Education Instructional Technology Center: 859-257-7967 (☎)
- Information Technology Customer Service Center:
  - http://www.uky.edu/UKIT/Help/
  - 859-218-HELP (☎)
- Distance Learning programs for assistance: http://www.uky.edu/DistanceLearning

Attendance:

Students are expected to review and read all course materials in the week the materials are available. This includes having read assigned chapters of the text, course slides/notes/handouts, assigned journal articles and any other additional materials. There are situations when absences are excused and extensions are granted. See below for policy on excused absences. Students are also expected to attend class, complete homework assignments and participate in activities and discussions.

Excused Absences

Students need to notify the instructor of absences prior to class when possible. Senate Rule 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the instructor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754 (☎)). Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

Academic Integrity

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university, may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: http://www.uky.edu/Ombud. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

> Part II of Student Rights and Responsibilities (Available online at http://www.uky.edu/StudentAffairs/Code/part2.htm)
>
> This provision states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, and is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.
>
> When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.
>
> Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them.
>
> If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Accommodations for Disabled Students:

If you have a documented disability that requires academic accommodations in this course, please make your request to the University Disability Resource Center. The Center will require current disability documentation. When accommodations are approved, the Center will provide the instructor with a Letter of Accommodation which details the recommended accommodations. Contact the Disability Resource Center, Jake Karnes, Director at 859-257-2754 (☎) or jkarnes@email.uky.edu.

Commitment to Diversity:

Given the diverse world that we live in, students are asked to demonstrate a personal commitment to being knowledgeable, aware, and respectful of cultural diversity, culturally appropriate research, and how experiences (their own and others) of privilege and oppression impact interpersonal communication and social justice. Students are encouraged to challenge themselves to grow and change in ways that make themselves more culturally- and socially-competent learners. The course will be conducted with openness and respect to all individuals' points of view and experience. The activities and discussions will not tolerate discrimination or prejudice toward any person or group's religion, ethnicity, disability, gender, or sexual orientation.

TENTATIVE Course Schedule (Subject to change)

A summary of the topics to be covered is found in the following table. Please know that the instructor retains the right to modify this list of topics, if necessary, to better meet the learning objectives of this course. Changes to the topics will be discussed with students and provided in writing as an addendum distributed electronically via e-mail and posted on the course Blackboard.

Table 1: Tentative Schedule for Spring 2015 EDP/EPE 660 Distance Learning Section: RESEARCH DESIGN & ANALYSIS IN EDUCATION

Date	Topic(s)	Note	Chapters
Week 01	Course overview, SPSS tutorial		1 & 2
Week 02	Introduction to regression, and simple linear regression		2 & 3
Week 03	Simple linear regression: Probabilistic model and the OLS method		3
Week 04	Multiple regression: Probabilistic model, assumptions, estimation, model selection	HW 1 due	4
Week 05	Multiple regression: ANOVA & nested models; contrasts for categorical predictors		4 & 5
Week 06	Multiple regression: Polynomial models, regression when raw data are unavailable		4 & 5
Week 07	Subset selection: Stepwise, all possible subsets, information criteria		6
Week 08	Regression diagnostics: Collinearity	HW 2 due	7
Week 09	Regression diagnostics: Outliers and influential cases		8
Week 10	No class	Spring break	
Week 11	Regression diagnostics: Residuals and residual plots		8
Week 12	Classification: Logistic regression (logit model): exponential function, logit		9
Week 13	Classification: Logit model for a binary outcome (versus probit model)		9
Week 14	Classification: Logistic regression interpretation, accuracy, cross-validation		9
Week 15	Poisson regression: Count outcome, poisson distribution, logarithm function	HW 3 due	Course notes
Week 16	Poisson regression: Over-dispersion, versus negative binomial model		Course notes