

COURSE APPROVAL ROUTING CHECK LIST

091026

1. **Course Number:** ACM PSM 640 1st Bulletin 11-5-09
2nd Bulletin 11-19-09
2. **Course Title:** Linear Regression and Correlation
 (no more than 70 characters)

Title Abbreviation: Lin Regress & Corr
 For use in Master Schedule (no more than 19 characters)

3. **Action:** New Course Revision IF Designation WAC

Requested Designation(s): _____

Course Proposal/Revision Check List

This checklist will help departments avoid some of the most common mistakes made on course proposals. Your use of the checklist will allow the College Senate Curriculum Committee to focus its review on more substantive issues and expedite the approval process.

- Proposal format conforms to the Directory of Policy Statements, Section IV:02.00 (2002).
- Proposal has been proofread for spelling, punctuation, grammar, style and gender-neutral language.
- If the course is a new course, reasons for the additions are included; if the course is a revision of an existing course, reasons for revision and a copy of the old course are included as well as the IF Narrative when appropriate.
- Catalog description follows the guidelines in the Curriculum Handbook, Appendix C.
- Student learning outcomes are coherent with course content and assessment.
- Outcomes are referenced with course content.
- All resource entries are alphabetized and conform to a specific style manual.
- Cross listed courses have been checked with all chairs and deans included in development of the course.

DEPARTMENT ACTION

Yvonne Seberg _____ 10/16/09
 Chair, Department Curriculum Committee Date

4. **Approved** with confirmation that all necessary laboratories, studios, resources, facilities and personnel for support of this course are available.
- David C. Wick _____ MATH 10/16/09
 Signature of Department Chairperson Department Date

Faculty (Check one) SNSS *School of Natural and Social Sciences*
 SOE *School of Education*
 SAH *School of Arts and Humanities*
 SOP *School of Professions*

DEAN'S ACTION

Approved with confirmation that all necessary laboratories, studios, resources, facilities and qualified faculty for support of this course are available.

 Date Signature of Dean (both Dean's if cross-listing)

COURSE PACKET INCLUDES:

- Electronic proposal form
- Attached electronic document with explanations of contingencies as stipulated at Dean's level
- One hard copy of proposal with attached contingencies and routing sheet with all appropriate signatures (copy of routing sheet in packet sent to Academic Affairs)
- For all revisions, one hard copy of current course should be submitted (e-copy is preferable when available)

COLLEGE SENATE ACTION

1. **Received**, logged and electronic packet and hard copies forwarded to the College Senate Office. Program title to be published in the *College Bulletin*.

10/27/09 Vincent Tomasci 091026
 Date Signature of College Senate Office Log Number

2. Action for Intellectual Foundations' Designation

 Recommend approval Signature of Assistant Dean, Intellectual Foundations

 Recommend disapproval Signature of Assistant Dean, Intellectual Foundations

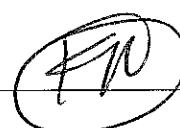
3. Action of the College Senate Curriculum Committee

Recommend approval and forward to College Senate
 11/17/2009 Alexander Chicola
 Date Signature of Chair, College Senate Curriculum Committee

 Recommend disapproval and return to Department

 Date Signature of Chair, College Senate Curriculum Committee

ACTION OF THE OFFICE OF ACADEMIC AFFAIRS

Approved and forwarded to President
 Signature  11/19/09
 Date

 Disapproved and returned to Department
 Signature Date

Prefix, Number and Name of Course: PSM 640 Linear Regression and Correlation

Credit Hours: 1

In Class Instructional Hours: 1

Labs: 0

Studio: 0

Field Work: 0

Catalogue Description:

Prerequisite: Admission to program or instructor permission

Simple linear regression and correlation, multiple linear regression, multicollinearity, multiple and partial correlations, confounding and interaction, sequential methods of model selection.

Reasons for addition:

To create a one-semester-hour module for the graduate Professional Applied and Computational Mathematics program where students will formulate and solve real life problems in various settings using regression analysis, a statistical tool that utilizes the relationship between a response variable and one or more predictor variables for the purposes of description, prediction and/or control.

Student Learning Outcomes: Students will	Course Content References:	Assessment:
1. construct and analyze simple and multiple regression models for real-life data and test for the appropriateness of the model.	I, II.A–E, II.I–J	Individual homework assignments, group work, examinations and computer projects.
2. compute and interpret simple, multiple, and partial correlation coefficients.	I.H, II.F, II.H	Individual homework assignments, group work, examinations and computer projects.
3. compare and contrast confounding and interaction effects.	II.G	Individual homework assignments, group work, examinations and computer projects.
4. detect the problem of multicollinearity and implement sequential methods for model selection.	II.H, II.K	Individual homework assignments, group work, examinations and computer projects.
5. use appropriate statistical software to analyze real world problems	I–II	Individual homework assignments, group work, and computer projects.

Course Content:

I. Simple linear regression and correlation

- A. Least squares and the fitted model
- B. Properties of the least squares estimators
- C. Inferences concerning regression coefficients
- D. Prediction
- E. Analysis of variance approach
- F. Diagnostic plots of residuals
- G. Transformation of data
- H. Correlation

II. Multiple linear regression

- A. Estimation of coefficients
- B. Properties of least squares estimators
- C. Analysis of variance in multiple regression
- D. Inferences in multiple linear regression
- E. Study of residuals and violation of assumptions
- F. Correlations: multiple, partial, and multiple-partial
- G. Confounding and interaction
- H. Multicollinearity
- I. Categorical or indicator variables
- J. Polynomial regression
- K. Sequential methods for model selection

Resources

Scholarship:

Allen, M. P., *Understanding Regression Analysis*, Plenum Press, 1997.

Brook, R. L., and Arnold, G. C., *Applied Regression Analysis and Experimental Design*, Dekker, 1985.

Darlington, R. B., *Regression and Linear Models*, McGraw Hill, 1990.

Draper, N. R., and Smith, H., *Applied Regression Analysis*, 3rd ed., Wiley, 1998.

Fox, J., *Applied Regression Analysis and Generalized Linear Models*, 2nd ed., Sage, 2008.

Freund, R. J., Wilson, W. J., and Sa, P., *Regression Analysis*, Elsevier, 2006.

Glantz, S., and Sinker, B. K., *Primer of Applied Regression and Analysis of Variance*, 2nd ed., McGraw-Hill, 2001.

Harell, F. E. Jr., *Regression Modeling Strategies*, Springer-Verlag, 2001.

Hocking, R. R., *Methods and Applications of Linear Models: Regression and Analysis of Variance*, 2nd ed., Wiley-Interscience, 2003.

Kleinbaum, D. G., Kupper, L. L., and Muller, K. E., *Applied Regression Analysis and Other Multivariable Methods*, 3rd ed., Duxbury Press, 1998.

Mason, R. L., Gunst, R. F., and Hess, J. L., *Statistical Design and Analysis of Experiments: With Applications to Engineering and Science*, 2nd ed., Wiley, 2003.

Mickey, R. M., *Applied Statistics: Analysis of Variance and Regression*, 3rd ed., Wiley-Interscience, 2004.

Montgomery, D. C., *Introduction to Linear Regression Analysis*, 2nd ed., Wiley, 1992.

Neter, J., Wasserman, W., and Kutner, M. H., *Applied Linear Statistical Models*, 4th ed., Richard D. Irwin, Inc., 1996.

Rao, C. R., *Linear Statistical Inference and its Applications*, 2nd ed., Wiley, 1973.

Seber, G. A. F., and Lee, A. J., *Linear Regression Analysis*, Wiley, 2003.

Sen, A., and Srivastava, M., *Regression Analysis: Theory, Methods, and Applications*, Springer-Verlag, 1997.

Vittinghoff, E., Glidden, D. G., Shiboski, S. C., and McCulloch, C. E., *Regression Methods in Biostatistics: Linear, Logistic, Survival, and Repeated Measures Models*, Springer-Verlag, 2005.

Weisberg, S., *Applied Linear Regression*, 3rd ed., Wiley-Interscience, 2005.

Wilson, W. J., *Regression Analysis: Statistical Modeling of a Response Variable*, Academic Press, 1998.

Periodicals:

Annals of Applied Statistics

Annals of Mathematical Statistics

Annals of Statistics

Biometrics

Biometrika

Communications in Statistics

Demography

International Statistical Review

Journal of the American Statistical Association

Journal of Applied Statistics

Journal of Applied Statistical Science

Journal of Statistical Computation and Simulation

Journal of the Royal Statistical Society

Scandinavian Journal of Statistics

Statistics in Medicine

Statistical Methods in Medical Research

Technometrics

The American Statistician

Electronic and/or Audiovisual Resources:

Pearson Education, Inc., "A Course in Business Statistics, Chapter 11: Introduction to Linear Regression and Correlation Analysis,"

wps.prenhall.com/bp_shannon_coursebus_3/0,6134,221280-,00.html.

Schombert, J., "Regression and Correlation Analysis,"

<http://abyss.uoregon.edu/~js/glossary/correlation.html>

StatsDirect.com, "Regression and Correlation,"

www.statsdirect.com/help/regression_and_correlation/rcr.htm.

Twomey, P. J. and Kroll, M. H., "How to use linear regression and correlation in quantitative method comparison studies," www.ncbi.nlm.nih.gov/pubmed/18324950.