UNIVERSITY COLLEGE
of the FRASER VALLEY

COURSE IMPLEMENTATION DATE: May, 1994
COURSE REVISED IMPLEMENTATION DATE: Sept, 2004
COURSE TO BE REVIEWED: Sept, 2008
(Four years after implementation date) (MMMM YY format)

OFFICIAL COURSE OUTLINE INFORMATION

Students are advised to keep course outlines in personal files for future use.
Shaded headings are subject to change at the discretion of the department and the material will vary - see course syllabus available from instructor

FACULTY/DEPARTMENT: **Science, Health and Human Services / Mathematics and Statistics**

COURSE NAME/NUMBER	FORMER COURSE NUMBER	UCFV CREDITS
MATH 390		**3**

COURSE DESCRIPTIVE TITLE: **Time Series & Forecasting**

CALENDAR DESCRIPTION:

This course introduces the basic ideas of time series analysis and, in particular, the Box-Jenkins Integrated-Auto-Regressive-Moving-Average (ARIMA) family of models. The emphasis of this course is on practical implementation of the methods.

PREREQUISITES: **MATH 270 AND MATH 302**
EFFECTIVE SEPTEMBER 2006, THE PREREQUISITES WILL BE: MATH 270, MATH 211.

COREQUISITES:

SYNONYMOUS COURSE(S)
(a) Replaces: ______ *(Course #)*
(b) Cannot take: ______ *(Course #)* for further credit.

SERVICE COURSE TO: ______ *(Department/Program)*
______ *(Department/Program)*

TOTAL HOURS PER TERM: 60

STRUCTURE OF HOURS

Lectures:	30	Hrs
Seminar:		Hrs
Laboratory:	30	Hrs
Field Experience:		Hrs
Student Directed Learning		Hrs
Other (Specify):		Hrs

TRAINING DAY-BASED INSTRUCTION
LENGTH OF COURSE: ______
HOURS PER DAY: ______

MAXIMUM ENROLLMENT: 36
EXPECTED FREQUENCY OF COURSE OFFERINGS: every second year

	Yes	No
WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only)	☐	☐
WILL TRANSFER CREDIT BE REQUESTED? (upper-level requested by department)	☐	☒
TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE:	☐	☒

AUTHORIZATION SIGNATURES:

Course Designer(s): ______ Math Department

Chairperson: ______ Peter Mulhern *(Curriculum Committee)*

Department Head: ______ Gillian Mimmack

Dean: ______ Jackie Snodgrass

PAC Approval in Principle Date:

PAC Final Approval Date: December 10, 2004

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

This course is designed to enable students to:

1. become acquainted with the theoretical and practical difficulties associated with correlated observations, and the standard procedure for analysis of such data;
2. become familiar with Integrated-Auto-Regressive-Moving-Average (ARIMA) models and how to use appropriate software to fit these models to data;
3. understand the relation of widely used empirical techniques to the mathematical ARIMA models and spectral methods;
4. be able to construct probabilistic forecasts from time series data;
5. understand the notion of seasonality and both construct ARIMA seasonal models and fit an ARIMA model to given seasonal data;
6. construct simple models to predict one time series from information contained in a second series by building and fitting an appropriate transfer function model.

METHODS:

Lectures and extensive use of large standard data sets and appropriate computer software, currently MINITAB and modern spreadsheets.

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

Credit can be awarded for this course through PLAR (Please check :) ☒ Yes ☐ No

METHODS OF OBTAINING PLAR:

Course challenge.

TEXTBOOKS, REFERENCES, MATERIALS:

[Textbook selection varies by instructor. An example of texts for this course might be:]

The textbook is chosen by a departmental curriculum committee. Recent texts used:

Box, G.E.P. and Jenkins, G.W. 2001. *Time Series Analysis, Forecasting and Control*. 3rd edition. Prentice-Hall.
Farnun, N.R. and Stanton, L.W. 1989. *Quantitative Forecasting Methods*. PWS-Kent Publishing, Boston.

SUPPLIES / MATERIALS:

STUDENT EVALUATION:

[An example of student evaluation for this course might be:]

Project	10%
Assignments	20%
In-class Tests	30%
Final Exam	40%

A student must obtain at least 40% on the final exam in order to pass this course.

COURSE CONTENT:

[Course content varies by instructor. An example of course content might be:]

First notions: methods of forecasting, differencing, regression, moving averages, Fourier methods, Schuster's periodogram, updating, Holt-Winters' exponentially weighted moving averages, seasonality.

Stationarity: the autocorrelation function, the spectral density function, estimates, variances, smoothing.

Linear random shock models: the auto-regressive moving-average models, the Yule-Walker equations, admissibility and invertibility, differencing.

Minimum mean square error forecasts: stochastic model building and identifications, diagnostic checking, monitoring forecasts.

Seasonal forecasting: simple models.

Linear transfer function models: the cross-correlation function, simple models relating two series.