Course Specification
(Bachelor)

Course Title:	Regression and Forecasting
Course Code:	INE 3271
Program:	Bachelor of Industrial Engineering
Department:	Industrial Engineering
College:	Engineering
Institution:	King Khalid University
Version:	1
Last Revision Date:	17 Nov 2025

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (2)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (5th level / 3th Year)					
4. Course general Description:					
The aim of this course is to provide students with the essential expertise to handle modern time series techniques. Idea is to introduce students to comprehensive set of tools and techniques for analyzing various forms of univariate and multivariate time series and for understanding the current literature in applied time series. After the course students will also be able to appreciate and apply key concepts of estimation and forecasting in a time series context. Endeavor will be to provide simple examples that illustrate how the theoretical results are used and applied in Practice. This course provides comprehensive training in regression analysis and forecasting techniques for data science, emphasizing R/Python programming. You will master time-series analysis, forecasting, linear regression, and data preprocessing, enabling you to make data-driven decisions across industries.					
5. Pre-requirements for this course (if any)**:**					
INE 2331					
6. Co-requisites for this course (if any)**:**					
NIL					
7. Course Main Objective(s):					
The aim of the course is to introduce the students to the fundamental of Regression analysis: multiple linear regression, diagnostics, and variable selection. Forecasting exponential smoothing techniques and autoregressive moving average models.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100
2	E-learning		
3	Hybrid		

No	Mode of Instruction	Contact Hours	Percentage
	• Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		30

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	knowledge about the fundamentals of Regression and forecasting and tools used for forecasting	K1	Lectures and tutorials	Assignments Midterm Exam Final Exam
2.0	Skills			
2.1	Evaluate the different data patterns,	S2	Lectures and tutorials	Assignments Midterm Exam Final Exam
2.2	Choosing a Forecasting Technique , Measures of forecasting accuracy			
2.3	Moving averages, Exponential smoothing, Simple Linear regression			
2.4	Multiple Regression Analysis, Box-Jenkins (ARIMA) Methodology	S2		
2.5	Formulate various forecasting using forecasting packages (MATLAB, R	S6	Lab	Lab exam and activities

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	Programming and MS Excel)]			
3.0	**Values, autonomy, and responsibility**			
3.1	Work individually or within a team and communicate effectively to perform the assigned tasked (Homework/Group Project)	V4	Projects	Assignments

C. Course Content

No	List of Topics	Contact Hours
1	Introduction and Review of Statistics	2
2	Introduction to Forecasting, Naive and Moving Average approaches	4
3	Weighted moving average approaches	4
4	Exponential smoothing approaches	4
5	Simple linear regression	2
6	Multiple linear regression	4
7	Seasonal models	4
8	Model building and residual analysis	2
9	ARIMA models, Seasonal ARIMA modeling	2
10	Advanced topics in regression and forecasting	2
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	6 to 8 Assignments	Every week	20
2.	Quiz 1	7	
3.	Quiz 2	12	
4.	Lab Exam	14	10
5.	Two Mid Term Exam	5, 10	30
6.	Final Exam	16	40
...			**100**

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Hyndman, Rob J., and George Athanasopoulos. *Forecasting: principles and practice*. OTexts, 2018. https://doi.org/10.32614/cran.package.fpp3 Forecasting, Time Series, and Regression, Bowerman, B.L., O'Connel,R. and Koehler,A., Duxbury Applied Series, 4th Edition, Duxbury Applied Series, Cengage Learning; 4th edition, 2004, **ISBN-13**: 978-0534409777, **ISBN-10**: 0534409776
Supportive References	• Statistics for business and economics, Anderson D.R., Sweeney D.J. and Williams T.A., 11th ed., Thomson (South – Western) Asia, Singapore, 2012, **ISBN**-10 :0324783256 **ISBN**-13: 978-0324783254 • Statistics for Management, Levin, R.I. and Rubin, D.S. Pearson Education, 7th Edition, 2011, **ISBN-13:** 978-1337093453**, ISBN-10:** 1337093459
Electronic Materials	R/MATLAB Software
Other Learning Materials	Lecture handouts

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with 50 seats and projector facility Laboratory- 25 desktop computer with Simio/ARENA software
Technology equipment (projector, smart board, software)	projector
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect (Questionnaire)

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Students assessment	Faculty	Direct
Quality of learning resources	Program Leaders	Direct
The extent to which CLOs have been achieved	Faculty	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Reviewed by Curriculum Committee Approved by Quality Committee
REFERENCE NO.	**9-6-47**
DATE	25/06/1447