Republic of the Philippines
BATANGAS STATE UNIVERISTY
The National Engineering University
Alangilan, Batangas City

COLLEGE OF INFORMATICS AND COMPUTING SCIENCES
MASTER OF SCIENCE IN COMPUTER SCIENCE

COURSE INFORMATION SYLLABUS (CIS)

VISION	A premier national university that develops leaders in the global knowledge economy.		
MISSION	A university committed to producing leaders by providing a 21st century learning environment through innovations in education, multidisciplinary research, and community and industry partnerships in order to nurture the spirit of nationhood, propel the national economy, and engage the world for sustainable development.		
Course Title	*Time-Series Data Analysis and Forecasting for Business and Finance*	**Course Code**	*MSDS 511*
Course Category	*Professional Course*	**Prerequisite(s)**	
Semester/year	*Second Semester*	**Credit Hours**	*3*
Course Instructor		**Reference CMO**	*CMO No. 07, s. 2010*
		Date Prepared	
		Revision No.:	*0*
Period of Study	*AY 2023-2024*	**Revision Date**	
Course Rationale and Description	This course provides a comprehensive overview of time-series data analysis and forecasting techniques, with a focus on applications in business and finance. Students will learn how to analyze and model time-series data, understand key concepts in time-series econometrics, and develop forecasting models to make informed business and financial decisions.		
Contact Hours	*3 hours lecture*		
Criteria for Assessment	*Problem Sets: 20%* *Midterm Exam: 30%* *Final Project: 20%* *Final Exam: 30%*		
Teaching, Learning, and Assessment Strategies	*This course seamlessly integrates synchronous and asynchronous learning approaches. Through video conferencing applications like Zoom and Google Meet, real-time classes provide immediate interaction. Alternatively, students can access lecture materials on Google Classroom, participating in topic-related discussions at their convenience. Submission deadlines offer flexibility, while social networking fosters collaborative learning and constant support.*		

Intended Learning Outcomes (ILO)

ILO	Upon completion of this course, the students should be able to:
ILO1	able to comprehend the characteristics of time-series data, including trend, seasonality, and noise, and explain their implications in business and financial contexts.
ILO2	able to apply appropriate statistical techniques to analyze time-series data, including measures of central tendency, dispersion, autocorrelation, and partial autocorrelation functions
ILO3	able to construct and interpret various time-series models
ILO4	able to critically evaluate the assumptions and limitations of time-series models, identify potential sources of error in forecasting, and propose solutions to improve forecasting accuracy and reliability.

Assessment Method and Distribution Map

Assessment Tasks (AT) Distribution				Intended Learning Outcomes								Domains		
Code	**Assessment Tasks**	**I/R/D**	**(%)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**C**	**P**	**A**
PS	Problem Sets	R	20	20	20	20	20	10	10			100		
ME	Midterm Exam	R	30	30	30	40						100		
FP	Final Project	D	20			50			50			100		
FE	Final Exam	R	30			50			50				100	
Total			**100**											

Note: All internal assessments with feedback will be made available within 2 week after each assessment submission

Textbook	1	"Time Series Analysis and Its Applications" by Robert H. Shumway and David S. Stoffer.
Other Books and Articles	2	Introduction to Time Series. Analysis and Forecasting by DOUGLAS C. MONTGOMERY, CHERYL L.
	3	The Analysis of Time Series: An Introduction by Chris Chatfield

	4	
Institutional Graduate Attributes (IGA)	**IGA**	**Institutional Graduate Attributes (IGA) Statements**
	IGA1	**Knowledge Competence**
		Demonstrate a mastery of the fundamental knowledge and skills required for functioning effectively as a professional in the discipline, and an ability to integrate and apply them effectively to practice in the workplace.
	IGA2	**Creativity and Innovation**
		Experiment with new approaches, challenge existing knowledge boundaries and design novel solutions to solve problems.
	IGA3	**Critical and Systems Thinking**
		Identify, define, and deal with complex problems pertinent to the future professional practice or daily life through logical, analytical and critical thinking.
	IGA4	**Communication**
		Communicate effectively (both orally and in writing) with a wide range of audiences, across a range of professional and personal contexts, in English and Pilipino.
	IGA5	**Lifelong Learning**
		Identify own learning needs for professional or personal development; demonstrate an eagerness to take up opportunities for learning new things as well as the ability to learn effectively on their own.
	IGA6	**Leadership, teamwork, and Interpersonal Skills**
		Function effectively both as a leader and as a member of a team; motivate and lead a team to work towards goal; work collaboratively with other team members; as well as connect and interact socially and effectively with diverse culture.
	IGA7	**Global Outlook**
		Demonstrate an awareness and understanding of global issues and willingness to work, interact effectively and show sensitivity to cultural diversity.
	IGA8	**Social and National Responsibility**
		Demonstrate an awareness of their social and national responsibility; engage in activities that contribute to the betterment of the society; and behave ethically and responsibly in social, professional and work environments.
Student Outcomes (SO)	**SO**	**Student Outcomes (SO) Statements**
	SO1	Ability to apply information technology principles and practices.
	SO2	Ability to apply suitable software engineering principles and practices to develop and maintain stable, secure, scalable, and maintainable software.
	SO3	Ability to produce effective solutions to complex information technology problems.
	SO4	Ability to recommend appropriate information technology solutions based on organizational needs and an evaluation of alternatives.
	SO5	Ability to identify and discuss professional, individual, organizational, societal, and regulatory implications of information systems and technology
	SO6	Ability to select technologies, policies, and procedures to assure the confidentiality, integrity, and availability of information and IT systems.
CDIO Framework Skills	**CDIO**	**CDIO Skills**
	CDIO1	**Disciplinary Knowledge & Reasoning**
		Knowledge of underlying mathematics and sciences, core engineering fundamental knowledge, advanced engineering fundamental knowledge, methods and tools
	CDIO2	**Personal and Professional Skills & Attributes**
		Analytical reasoning and problem solving; experimentation , investigation and knowledge discovery; system thinking; attitudes, thoughts and learning; ethics, equity and other responsibilities
	CDIO3	**Interpersonal Skills: Teamwork & Communication**
		Teamwork, communications, communication in a foreign language
	CDIO4	**Conceiving, Designing, Implementing & Operating Systems**
		External, societal and environmental context, enterprise and business context, conceiving, systems engineering and management, designing, implementing, operating
	SDG	**SDG Skills**
	SDG1	**Envisioning**

Sustainable Development Goals Skills		Establish a link between long-term goals and and immediate actions, and motivate people to take action by harnessing their deep aspirations.
	SDG2	**Critical Thinking and Reflection**
		Examine economic, environmental, social and cultural structures in the context of sustainable development, and challenges people to examine and question the underlying assumptions that influence their world views by having them reflect on unsustainable practices.
	SDG3	**Systemic Thinking**
		Recognise that the whole is more than the sum of its parts, and it is a better way to understand and manage complex situations.
	SDG4	**Building Partnerships**
		Promote dialogue and negotiation, learning to work together, so as to strengthen ownership of and commitment to sustainable action through education and learning.
	SDG5	**Participation in Decision Making**
		Empower oneself and others through involvement in joint analysis, planning and control of local decisions.

COURSE POLICIES

A. GRADING SYSTEM

The grading system adopted by this course is as follows:

Excellent	1.00	98 - 100
Superior	1.25	94 - 97
Very Good	1.50	90 - 93
Good	1.75	88 - 89
Meritorious	2.00	85 - 87
Very Satisfactory	2.25	83 - 84
Satisfactory	2.50	80 - 82
Fairly Satisfactory	2.75	78 - 79
Passing	3.00	75 - 77
Failure	5.00	Below 70
Incomplete	INC	

*Students who got a computed grade of 70-74 will be given an appropriate remedial activity in which the final grade should be either passing (3.0) or failure (5.0).

B. CLASS POLICY

Prompt and regular attendance of students is required. Total unexcused absences shall not exceed ten (10) percent of the maximum number of hours required per course per semester (or per summer term). A semester has 18 weeks.

MISSED EXAMINATIONS

Students who failed to take the exam during the schedule date can be given a special exam provided he/she has valid reason. If it is health reason, he/she should provide the faculty with the medical certificate signed by the attending Physician. Other reasons shall be assessed first by the faculty to determine its validity.

ACADEMIC DISHONESTY

Academic dishonesty includes acts such as cheating during examinations or plagiarism in connection with any academic work. Such acts are considered major offenses and will be dealt with according to the University's Student Norms of Conduct.

DROPPING

Dropping must be made official by accomplishing a dropping form and submitting it at the Registrar's Office before the midterm examination. Students who officially drop out of class shall be marked "Dropped" whether he took the preliminary examination or not and irrespective of their preliminary grades.

A student who unofficially drops out of class shall be given a mark of "5.0" by the instructor.

C. OTHER COURSE POLICIES AND REQUIREMENTS

Teaching, Learning, and Assessment (TLA) Activities

Ch.	Topics / Reading List	Wks	Topic Outcomes	ILO		SO	Delivery Method
	Orientation & Introduction	1	Presentation of Syllabus, Class Rules				Lecture / discussion
1	*Introduction to Time-Series Data*	2	*Overview of time-series data* *Components of time-series: trend, seasonality, and noise* *Time-series data visualization techniques*	1		1,5	Lecture / discussion
2	*Time-Series Descriptive Analysis*	3,4	*Measures of central tendency and dispersion* *Autocorrelation and partial*				Lecture / discussion

			Autocorrelation and partial autocorrelation functions, Box-Jenkins methodology for time-series analysis	2		1,5	
3	Regresssion Models, Times series decomposition	5,6	*Introduction, Least Squares Estimation, statistical inference, Prediction, Variable selection, regression models, Classical decomposition,X11, SEATS, STL*	3		1,4	Lecture / discussion
4	*Time-Series Modeling - ARIMA Models*	7,8	*Autoregressive (AR) models* *Moving average (MA) models* *Integrated (I) models* *Introduction to ARIMA models*	3		1, 3,4	Lecture / discussion /Lab Activity
	Assessment no.1: **Midterm Examination**	9				1	Online Examination
5	*Advanced Time-Series Models*	10	*Seasonal ARIMA (SARIMA) models* *Exponential smoothing methods* *Introduction to state-space models*	4		1,3,4	Lecture / discussion /Lab Activity
6	*Model Selection and Diagnostic Checks*	11,12	*Model identification, estimation, and testing* *Diagnostic checks for time-series models* *Model selection criteria (AIC, BIC)*	5		6	Discussion/ Simulation Demo and Lab Assessment
7	*Forecasting Techniques*	13	*Point forecasts and interval forecasts* *Evaluation metrics for forecasting accuracy* *Forecasting with exogenous variables*	5		5	Lecture / discussion
8	Financial Time-Series Analysis	14, 15	*Time-series analysis in financial markets* *Volatility modeling (ARCH, GARCH models)* *Event studies and abnormal returns*	6		5	Lecture / discussion /Lab Activity
9	Industry Applications and Case Studies	16	*Application of time-series analysis in business and finance* *Case studies and real-world applications* *Emerging trends and challenges in time-series forecasting*	6		5	Lecture / discussion
	Assessment no.2: **Final Examination**	17				1,5,6	Online Examination
	Submission of Research Project	18					

Assessment Schedule		**Week No.**																
Assessment Method	**Distribution**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
	Problem Sets	x		x		x				x		x		x				
	Midterm Examination							x										
	Final Examination																x	
	Final Project															x		

-CPA	**ILOs**	**STUDENT OUTCOMES (SO): Mapping of Assessment Tasks (AT)**									
		SO1	**SO5**	**SO6**				**C**		**P**	**A**

ILO-SO and ILO Mapping										
ILO1	x		x				x		x	x
ILO2		x							x	
ILO3	x						x			
ILO4		x								x
ILO5										
ILO6										

ILO-IGA Mapping	INSTITUTIONAL GRADUATE ATTRIBUTES (IGA): Mapping of Assessment Tasks (AT)									
ILOs	**IGA1**	**IGA2**	**IGA3**							
ILO1	x									
ILO2	x									
ILO3		x								
ILO4		x	x							
ILO5										
ILO6										

ILO-CDIO and ILO-SDG Mapping	CDIO SKILLS				SDG Skills					
ILOs	**CDIO1**	**CDO2**	**CDIO4**		**SDG1**	**SDG2**	**SDG3**		**SDG4**	**SDG5**
ILO1	x				x	x	x		x	x
ILO2	x				x	x	x		x	x
ILO3		x			x	x	x		x	x
ILO4		x	x		x	x	x		x	x
ILO5										
ILO6										

Prepared by:	Reviewed by:	Approved by:
Faculty	**DR. MARICEL GRACE Z. FERNANDO** Department/Program Chairperson	**DR. PRINCESS MARIE B. MELO** College Dean/ Head, Academic Affairs
Date:	Date:	Date:

Remarks:

1 The syllabus is to be distributed to the students in the first week of the semester.
2 Any changes to the syllabus shall be communicated (in writing) to the Program Chair and the approved revised version must be
3 The course instructor may set a more stringent similarity percentage (minimum 20%) for their respective courses pertaining to student's