

SÍLABO 2025-1

I. INFORMACIÓN GENERAL

Nombre del curso:	Econometría Intermedia: Macro
Clave del curso:	1ECO24
Carácter:	Alternativo/Obligatorio (Tipo A)
Créditos:	5
Número de horas de teoría:	4
Número de horas de prácticas:	2
Clave del horario:	0821
Profesor:	Gabriel Rodríguez
Correo electrónico PUCP:	gabriel.rodriguez@pucp.edu.pe
Horario de sesiones teóricas:	Martes y Jueves de 08:00AM a 10:00AM
Jefe(s) de prácticas:	Luis Limas Calderón (luis.limasc@pucp.edu.pe) Piero Fernández-Dávila (piero.fernandezd@pucp.edu.pe)
Horario de sesiones prácticas:	Sábados de 2:00PM a 4:00PM

II. SUMILLA

Es un curso teórico-práctico del subgrupo de alternativo obligatorio de la especialidad de Economía. Aporta al desarrollo de las competencias de análisis cuantitativo, investigación, aprendizaje autónomo, y ética y responsabilidad social. Desarrolla modelos de econometría a un nivel intermedio. Algunos de estos temas son conceptos de estacionariedad, teoría asintótica, modelos ARMA, no estacionariedad univariada, modelos multivariados estacionarios (VAR), no estacionariedad multivariada (VAR y cointegración), forma espacio-estado y Filtro de Kalman, Modelos de volatilidad, entre otros.

III. PRESENTACIÓN

El curso supone que los estudiantes han seguido y aprobado satisfactoriamente el curso de *Fundamentos de Econometría* (1ECO11) anteriormente conocido como *Econometría 1* (ECO 261) o los respectivos cursos que se juzguen equivalentes. El desarrollo satisfactorio del curso supone conocimientos fundamentales de estadística, cálculo matemático y manipulación de matrices. Una rápida revisión de algunos conceptos será hecha cuando sea necesario. Sin embargo, se aconseja una revisión del apéndice matemático de algún libro de econometría como Hamilton (1994), Greene (2005) o Wooldridge (2000). Los objetivos

del curso son los siguientes: (i) ofrecer a los estudiantes los elementos teórico-prácticos de tópicos que continúan lo desarrollado en el curso previo de Econometría. Asimismo, presentar y desarrollar recientes tópicos propuestos en la literatura econométrica; (ii) contribuir al análisis empírico en economía. En lo posible, dichas aplicaciones serán hechas para el caso Peruano; (iii) contribuir al análisis empírico univariado y/o multivariado de series macroeconómicas. En este sentido, el uso del computador es un elemento importante en el desarrollo del curso.

IV. RESULTADOS DEL APRENDIZAJE

Con el desarrollo del curso y al final del mismo, los alumnos podrán lograr: (i) conocer y comprender los elementos teórico-prácticos de tópicos que continúan lo desarrollado en el curso previo de Econometría. Asimismo, conocer y comprender recientes conceptos y modelos econométricos; (ii) realizar análisis empírico usando datos reales en el ámbito de la macroeconomía, en especial de la economía Peruana; (iii) uso del programa *MatLab*.

V. CONTENIDO DEL CURSO

1. Introducción. Algunas características de series de tiempo macroeconómicas.
2. Conceptos de Teoría Asintótica.
3. Estacionariedad Univariada. Modelos ARMA.
4. No Estacionariedad Univariada: Tests de Raíces Unitarias.
5. Modelos de Vectores AutoRegresivos (VAR).
6. Modelos de Vectores AutoRegresivos Estructurales (SVAR).
7. No Estacionariedad Multivariada: Cointegración y Modelo VECM.
8. Forma Espacio-Estado, Filtro de Kalman y Otros Filtros.
9. Modelos de Volatilidad.
10. (Opcional) Introducción a Modelos No Lineales 1: Umbrales.
11. (Opcional) Introducción a Modelos No Lineales 2: Cambio de Regimen.

VI. METODOLOGÍA

El curso cuenta con clases teóricas y sesiones de prácticas/laboratorios todas las cuales serán desarrolladas de manera presencial. Seguiremos contando con una página del curso en la plataforma PAIDEIA donde se colocará cualquier material/recurso que sea necesario o útil para el desarrollo del curso. Todas las clases contienen la siguiente estructura: presentación y motivación del tópico o tema a desarrollar, desarrollo de los componentes del tópico, ejemplos basados en simulaciones y en la realidad para la comprensión del tópico respectivo.

En lo posible, se realizarán aplicaciones empíricas usando algún software instalado en el aula de clases. En todo momento se formularán preguntas que fomenten la participación de los alumnos. En ese sentido, para apoyar e incentivar la participación de los estudiantes, las intervenciones (a través de preguntas y/o respuestas) son sensibles de bonificaciones. Los desarrollos teóricos serán siempre complementados con ejemplos de trabajos empíricos aplicados a la economía Peruana o a otros países. Las sesiones prácticas y laboratorios tratarán de tópicos abordados durante cada semana en las clases teóricas y servirán de complemento al entendimiento de los diferentes temas del Curso. El uso del computador es un elemento importante en el desarrollo del curso. En general, haremos uso de softwares como *Eviews*, *Stata* y *MatLab*. Guías de estos programas pueden encontrarse en Internet. Los alumnos son libres de escoger la guía o tutorial que le sea más conveniente. De otro lado, es bueno mencionar que existe un software econométrico denominado *JMulti* el cual es gratuito. Se recomienda que los estudiantes instalen dicho programa en sus respectivas computadoras. Este programa puede ser obtenido gratuitamente entrando a la página web del Profesor Helmut Lütkepohl. Otro software gratuito que puede ser instalado en sus computadoras es *R* (*R-Studio*).

VII. EVALUACIÓN

La evaluación del curso se basa en tres elementos: prácticas calificadas (PCs), un examen parcial (EP) y un examen final (EF). Dado el carácter práctico del curso, habrán 4 prácticas calificadas. La PC1 y la PC3 son individuales y comprenderán ejercicios a mano y/o programación. Estas prácticas serán realizadas en el salón de prácticas. La PC2 y la PC4 serán elaboradas en grupos y comprenderán ejercicios a mano y/o programación que serán resueltos en un plazo de dos semanas. El 22 de Abril y el 10 de Junio los alumnos recibirán los ejercicios de la PC2 y la PC4, respectivamente. Ninguna nota de las prácticas será anulada. Los grupos serán formados en las primeras semanas de clases. Asimismo, en la primera semana de prácticas será distribuido el cronograma de prácticas completo. Las fechas de los exámenes son fijadas por la Facultad y son inamovibles. La evaluación es la siguiente:

1. Prácticas Calificadas: 40%. Las fecha de las Prácticas Calificadas (PCs) se darán a conocer la primera semana de clases. Las PC1 y PC3 serán desarrolladas de manera tradicional, es decir en el aula correspondiente. Las PC2 y PC4 serán realizadas en grupos y el plazo para resolverlas es de dos (2) semanas.
2. Examen Parcial (EP): 30% ([Semana 9, Jueves 22/05/2025 de 08:00AM a 10:00AM](#)).
3. Examen Final (EF): 30% ([Semana 16, Jueves 10/07/2023, de 08:00AM a 10:00AM](#)).

La fórmula de calificación es: $0.4 \times \overline{PC} + 0.30 \times EP + 0.30 \times EF$ donde \overline{PC} es el promedio de las cuatro (4) PCs.

VIII. BIBLIOGRAFÍA

La econometría ha evolucionado de manera importante en los últimos 25-30 años y consecuentemente debemos hacer algunas priorizaciones debido al corto tiempo del curso. Una

lista de referencias (no exhaustiva) es otorgada con la finalidad de completar detalles o profundizar en ciertos temas de mayor interés para el estudiante y el curso. Ningún libro es obligatorio como manual del curso. Sin embargo, el material dictado en las clases teóricas y prácticas es el material fundamental para la comprensión y el éxito del curso. A continuación se presenta una lista de referencias (libros y papers). Es necesario notar que la lista de papers incluye aplicaciones empíricas en la mayoría de los casos. Asimismo, se puede consultar la guía temática de Economía: <https://guiastematicas.biblioteca.pucp.edu.pe/economia> y Finanzas <https://guiastematicas.biblioteca.pucp.edu.pe/finanzas> elaborada por la Biblioteca Alberto Flores Galindo.

1 Libros

1. Anderson, T. W. (1971), *The Statistical Analysis of Time Series*, John Wiley & Sons.
2. Anderson, B., Moore, J. B. (1978), *Optimal Filtering*. Prentice-Hall Information and System Sciences Series.
3. Banerjee, A., J. J. Dolado, J. W. Galbraith y D. F. Hendry (1993), *Cointegration, Error Correction and the Econometric Analysis of Non Stationary Data*, Oxford University Press.
4. Bierens, H. J. (1996), *Topics in Advanced Econometrics*, Cambridge University Press.
5. Billingsley, P. (1979), *Probability and Measure*, New York: John Wiley.
6. Brockwell, P. J. y R. A. Davis (2006), *Time Series: Theory and Methods*, Segunda Edición, Springer-Verlag.
7. Brooks, C. (2008), *Introductory Econometrics for Finance*, Second Edition, Cambridge University Press.
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9. Canova, F. (2007), *Methods for Applied Macroeconomic Research*. Princeton University Press.
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13. Davidson, J. (1997), *Stochastic Limit Theory*, Oxford University Press.
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15. De Jong, D., Dave, C. (2007), *Structural Macroeconometrics*. Princeton University Press.
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17. Franses, P. H. (1999), *Time Series Models for Business and Economic Forecasting*, Cambridge University Press.
18. Franses, P. H. y Dick van Dijk (1999), *Non-Linear Time Series Models in Empirical Finance*, Cambridge University Press.
19. Fuller, W. A., (1996), *Introduction to Time Series*, 2nd ed. John Wiley, New York.
20. Granger, C. W. J. y T. D. Teräsvirta (1993), *Modelling Nonlinear Economic Relationships*, Advanced Texts in Econometrics, Oxford: Oxford University Press.
21. Gregorioux, G. N. y R. Pascalau (2011), *Nonlinear Financial Econometrics. Markov Switching Models, Persistence and Nonlinear Cointegration*, Palgrave MacMillan.
22. Hamilton, J. D. (1994), *Time Series Analysis*, Princeton University Press.
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28. Johansen, S. (1995), *Likelihood-Based Inference in Cointegrated Vector Autoregressive Models*, Oxford University Press.
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31. Koop, G. (2003), *Bayesian Econometrics*, John Wiley.
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33. Long, J. S. y J. Freese (2006), *Regression Models for Categorical Dependent Variables Using Stata*, 2da Edición, Stata Press.
34. Lütkepohl, H. (2005). *New Introduction to Multiple Time Series Analysis*. Springer.

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36. Maddala, G. S. y I. M. Kim (1998), *Unit Roots, Cointegration and Structural Change*, Cambridge University Press.
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54. Zivot, E. y J. Wang (2003), *Modeling Financial Time Series With S-Plus*, Springer.

2 Papers

2.1 Tests de Raiz Unitaria

1. Banerjee, A., R. Lumsdaine, y J. H. Stock (1992), "Recursive and Sequential Tests of the Unit Root and Trend Break Hypothesis," *Journal of Business and Economic Statistics* **10**, 271-288.
2. Campbell, J. Y. y P. Perron (1991), "Pitfalls and Opportunities: What Macroeconomists Should Know About Unit Roots," in *NBER Macroeconomics Annual*, O. J. Blanchard y S. Fisher, Editors, **Vol. 6**, 141-201.
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4. Elliott, G., T. J. Rothenberg y J. H. Stock (1996), "Efficient Tests for an Autoregressive Unit Root," *Econometrica* **64**, 813-836.
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7. Kwiatkowski, D., P. C. B. Phillips, P. Schmidt, y Y. Shin (1992), "Testing the Null Hypothesis of Stationarity against the Alternative of a Unit Root: How sure are we that economic time series have a unit root," *Journal of Econometrics* **54**, 159-178.
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2.2 Modelos VAR, SVAR y Cointegración

1. Alvarado, M., y G. Rodríguez (2025), “Time-varying effects of financial uncertainty shocks on macroeconomic fluctuations in Peru,” *Journal of International Money and Finance* **152**, 103276. See also Working Paper **531**, Departamento de Economía, PUCP.

2. Alvarado Silva, P., M. Cáceres Quispe, y G. Rodríguez (2024), “Regime-Switching, Stochastic Volatility and Impacts of Monetary Policy Shocks on Macroeconomic Fluctuations in Peru,” Working Paper **537**, Departamento de Economía, PUCP.
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IX. CRONOGRAMA

Inicio de Semestre: Lunes 24 de Marzo 2025

Fin de Semestre: Sábado 19 de Julio 2025

SEMANAS/FECHAS	TEMAS/CONTENIDOS	FORMA DE TRABAJO
Semana 1 (25/03/2025, 27/03/2025)	Introducción. Series de tiempo macroeconómicas. Conceptos de Teoría Asintótica.	Notas. Lecturas. Ejercicios.
Semana 2 (01/04/2025, 03/04/2025)	Conceptos de Teoría Asintótica. Estacionariedad Univariada.	Notas. Lecturas. Ejercicios.
Semana 3 (08/04/2025, 10/04/2025)	Modelos ARMA.	Notas. Lecturas. Ejercicios.
Semana 4 (15/04/2025, 17/04/2025)	Modelos ARMA. No Estacionariedad Univariada.	Notas. Lecturas. Ejercicios.
Semana 5 (22/04/2025, 24/03/2025)	No Estacionariedad Univariada. Raíces Unitarias.	Notas. Lecturas. Ejercicios.
Semana 6 (29/04/2025, 01/05/2025)	Raíces Unitarias.	Notas. Lecturas. Ejercicios.
Semana 7 (06/05/2025, 08/05/2025)	Modelos VAR. Modelos VAR Estructurales (SVAR).	Notas. Lecturas. Ejercicios.
Semana 8 (13/05/2025, 15/05/2025)	Modelos VAR Estructurales (SVAR).	Notas. Lecturas. Ejercicios.
Semana 9 (Jueves 22/05/2025)	EXÁMENES PARCIALES	Jueves 22/05/2025: 08AM-10AM
Semana 10 (27/05/2025, 29/05/2025)	No Estacionariedad Multivariada. Cointegración. Modelo VECM.	Notas. Lecturas. Ejercicios.
Semana 11 (03/06/2025, 05/06/2025)	Modelo VECM. Forma Espacio-Estado y Filtro de Kalman.	Notas. Lecturas. Ejercicios.
Semana 12 (10/06/2025, 12/06/2025)	Filtro de Kalman. Otros Filtros.	Notas. Lecturas. Ejercicios.
Semana 13 (17/06/2025, 19/06/2025)	Volatilidad.	Notas. Lecturas. Ejercicios.
Semana 14 (24/06/2025, 26/06/2025)	Volatilidad.	Notas. Lecturas. Ejercicios.
Semana 15 (01/07/2025, 03/07/2025)	Introducción a Modelos No Lineales (Transición Suave, Markov Switching)	Notas. Lecturas. Ejercicios.
Semana 16 (Jueves 10/07/2025)	EXÁMENES FINALES	Jueves 10/07/2025: 08AM-10AM
Semana 17	EXÁMENES FINALES	

XI. PLAGIO

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Materiales informativos sobre equidad de género y erradicación del hostigamiento:
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Nuestra universidad y sus aulas de clase son espacios seguros para todos/as los/as estudiantes. En ese sentido, si algún/a estudiante tiene alguna necesidad o inquietud, comuníquese lo antes posible al/la docente y/o al área de bienestar de la facultad a través del correo bienestarsociales@pucp.edu.pe.

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Lima, Marzo 2025