

ECON 8005	Model Building and Simulation	L	T	P	C
Version 1.0		1	0	0	1
Pre-requisites/Exposure	Quantitative Methods in Economics, Microeconomics, Macroeconomics, Understanding Energy Sector, and Econometrics				
Co-requisites	Understanding of Computer Programming				

Course Objectives

- a) To know the different techniques of model building and simulations.
- b) To use economic analysis to predict and verify the effects of government intervention on behaviour
- c) To estimate various macroeconomic models.

Course Outcomes

On completion of this course, the students will be able to

CO1. To have conceptual clarity of various type of models used in Economic Analysis;

CO2. To apply various optimization techniques in Energy sector.

CO3. To know the application of various macroeconomic models;

CO4. To estimate and analyse macroeconomic models;

Catalog Description

In recent years, globally, as well as in India, the computer revolution has increased linkages between theoretical modelling and empirical work in economics. Now, macro simulation results are increasingly used in economic policy formulation. There is also much demand for application oriented economists in the present job market.

The objective of this course is to equip the students with the techniques of model building in economics, and expose them to the art of simulations. It is essentially an application-oriented course. It is basically intended to develop analytical and quantitative skills, especially to handle macroeconomic policy issues.

The pre-requisites for this course include Macroeconomics, Mathematics for Economics and Econometrics. Familiarity with computers and computer applications, such as data base management, typing skills, working knowledge on MS office will be helpful. The computer lab work will be based on the use of two softwares Gretl for windows (Open source license) and GAMS.

Course Content

Unit I: 2 lecture hours

Introduction to Model Building: - Basic issues in economic model building, topic relating to specification, identification and estimation of models and closure rules.

Unit II: 3 lecture hours

Taxonomy of Models – Mathematical and econometric models, optimizing models, systematic outline of AGE models-demonstration using the Shoven-Walley model, macro econometrics models-estimation demonstration using Klein's Model I, structure of Klein-Goldberger model, static and dynamic models, sectoral models; simulation models, simultaneous and recursive models.

Unit III: 2 lecture hours

Estimation and Evaluation of Models – Various methods of estimating macro, policy-oriented and programming models; testing the validity of models-principles and criteria,

Unit IV: 2 lecture hours

Empirical and Policy Models built for India – IEG-DSE, RBI and other macro econometric models.

Unit V: 3 lecture hours

Simulations of Models: Static and Dynamic – Basic concepts in simulations, development and implementation of simulation modelling, design of simulation models, simulation of sectoral and macro models, ex-ante and ex-post simulations.

Text Books

1. Bedkin, R., L.R. Klein and K. Marwah, A History of Macroeconometric Modelling, Edward Elgen, 1991
2. Boumans, Marcel. 2005. How Economists Model the World into Numbers. London: Routledge.

Reference Readings

1. Gujarati, D. N. (1995). Regression on dummy variables. *Basic Econometrics*. 3rd ed. Singapore: McGraw-Hill, 499-539.
2. Klein, L. R. (1980). What kind of macroeconomic model for developing economies?. In *Money and Monetary Policy in Less Developed Countries* (pp. 665-674).
3. Fox, K. A. (1956). Econometric models of the United States. *Journal of Political Economy*, 64(2), 128-142.
4. Klein, L. R., Welfe, A., & Welfe, W. (1999). *Principles of macroeconomic modeling* (Vol. 36). North-Holland.
5. Krishnamurty, K., Pandit, V., Palanivel, T., Saibaba, P., & Pratap, D. (1999). An Econometric Model for India, 1971-95. *Journal of Quantitative Economics*. Krishnamurty, K. (2002). Macroeconomic Models for India: Past, Present and Prospects. *Economic and Political Weekly*, 4295-4308.
6. Krishnamurti, K., & Pandit, V. (1984). Macroeconomic Modelling of the Indian Economy. *Indian Economic Journal*, 19(1), 1-14.
7. Boland, L. A. (2014). *The Methodology of Economic Model Building (Routledge Revivals): Methodology after Samuelson*.
8. Lehtinen, A., & Kuorikoski, J. (2007). Computing the perfect model: Why do economists shun simulation?. *Philosophy of Science*, 74(3), 304-329..
9. Narayana, N. S. S., Parikh, K. S., & Srinivasan, T. N. (2013). *Agriculture, Growth and Redistribution of Income: Policy Analysis with an Applied General Equilibrium Model in India*(Vol. 190). Elsevier.
10. Pindyck, R. S., & Rubinfeld, D. L. (1988). Econometric models and economic forecasts.
11. Rattsø, J. (1982). Different macroclosures of the original Johansen model and their impact on policy evaluation. *Journal of Policy Modeling*, 4(1), 85-97.
12. Shoven, J. B., & Whalley, J. (1984). Applied general-equilibrium models of taxation and international trade: an introduction and survey. *Journal of Economic Literature*, 22(3), 1007-1051.
13. Taha, H. A. (2005). *Operations research: An introduction (for VTU)*. Pearson Education India.

Modes of Evaluation: Quiz/ Project submission/ presentation/ Class room and case discussion/ Written Examination

Examination Scheme:

Components	Quizzes	Group Project Presentation/ Submission	ESE
Weightage (%)	20	30	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	COURSE OUTCOMES (COs)	POs
CO 1	To have conceptual clarity of various type of models used in Economic Analysis.	PO1, PO2, PO3, PO8, PSO9, PSO10, PSO14
CO 2		PO1, PO2,

	To apply various optimization techniques in Energy sector.	PO3,PO8,PSO9,PSO10,PSO14
CO 3	To know the application of various macroeconomic models	PO1, PO2,PO3, PO8, PO9, PSO10
CO 4	To estimate and analyse macroeconomic models.	PO1, PO2,PO3, PO5, PO6, PO8, PSO9, PSO10, PSO14

Program Outcome / Course Outcome mapping

Course Outcomes	CO 1	CO 2	CO 3	CO 4
PO 1	2	1	2	2
PO 2	1	1	1	1
PO 3	2	3	2	3
PO 4				
PO 5				3
PO 6				3
PO 7				
PO 8	3	3	3	3
PSO 9	2	3	1	2
PSO 10	3	3	3	3
PSO 11				
PSO 12				
PSO 13				
PSO 14	3	3		3

Course Code	Course Title	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	
OGET 8005	Model Building and Simulations	2	1	3		1	1		3	2	3				2	
			Students will be able to develop and evaluate alternate managerial choices and	Students will demonstrate effective application capabilities of their theoretical understanding of economic theories-Microeconomics, Macroeconomics and trade theories to the renewable and non-renewable energy sectors.	Students will be able to exhibit effective decision making skills, employing analytical and critical thinking ability	Students will demonstrate effective oral and written communication skills in presenting frameworks, models and regulations of the energy sector.	Students will be able to work effectively in teams and demonstrate team building capabilities	Students will exhibit leadership and networking skills.	Students will demonstrate sensitivity towards ethical and moral issues and have ability to address them in energy economics.	Students will demonstrate employability traits in line with the changing dynamics of renewable and non-renewable energy sectors.	Students will demonstrate strong conceptual knowledge of economic theory in the context of renewable and non-renewable energy sectors.	Students will demonstrate effective understanding of economics as it is applicable to energy markets, energy pricing, energy trading and risk management.	Students will demonstrate analytical skills in designing solutions for energy efficiency.	Students will exhibit the ability to evaluate working of energy policies.	Students will have domestic and global perspective towards legal frameworks and environmental regulations with respect to energy sectors.	Students will exhibit deployable skills pertinent to the renewable and non-renewable energy sectors.

- 1 – Weakly mapped
2 – Moderately mapped
3 – Strongly mapped

Model Question Paper

Name:	
Enrolment No:	

Course: ECON 8005– Model Building and Simulation**Programme: MA Economics (EE)****Semester: ODD-2016-17****Time: 3 hrs.****Max. Marks: 100****Instructions:**

Attempt all questions from **Section A** (each carrying 2 marks); any **Four Questions** from **Section B** (each carrying 5marks). **Two from Section C** (each carrying 30 marks).

Section A (All Questions are Mandatory) Explain in Two to Three Sentences 20

1	Endogenous variable.	[2]	CO 1
2.	Exogenous variable	[2]	CO 1
3.	Stochastic model.	[2]	CO 1
4.	Deterministic model.	[2]	CO 1
5.	Simulation	[2]	CO 1
6.	Closed economy model	[2]	CO 1
7.	Slope of a regression model.	[2]	CO 2
8.	Exact identification	[2]	CO 1
9.	Over identification	[2]	CO 2
10.	2*2 Models	[2]	CO 1
SECTION B (Attempt any Four Questions) Short Notes		20	
1.	What is distributed lag model in Economics?	[5]	CO 2
2.	What are the basic steps in econometric modelling process?	[5]	CO 3
3.	What are the different types of data used in econometrics?	[5]	CO 2
4.	Construct 4 econometric models on the basis of economic theories you have learned so far.	[5]	CO 3
5.	Give some examples of applications of where model building can be used and the related softwares	[5]	CO 2
SECTION C (Attempt any Two Questions) Long Question Type		60	
7.	Construct a simultaneous equation model describing the market mechanism of a agricultural commodity. Derive the reduced form parameters in terms of the structural parameters of your model. What is the economics meaning of the structural and the reduced form parameters.	30	CO 2,3,4
8.	Given the simple Keynesian model of income determination.	30	CO 2,3,4

9.	$C_t = a_0 + a_1 Y_t + u_1$ $I_t = b_0 + b_1 Y_t + b_2 Y_{t-1} + u_2$ $Y_t = C_t + I_t + G_t$	30	CO2,3,4
10.	Derive the reduced form coefficients of the behavioural equations.	30	