

INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH

SEMESTER: II

COURSE TITLE: MICROECONOMICS-II

INSTRUCTOR: Dr. GOPAKUMAR ACHUTHANKUTTY

TEACHING ASSISTANT: SUMANA KUNDU

COURSE DESCRIPTION: This is a sequel of the core course 5101: Microeconomics - I. The course is divided into three modules: (i) decision making under uncertainty, (ii) theory of general equilibrium, and (iii) sources of market failure. The theoretical tools developed in this course are essential to pursue a career both in academics and industry.

COURSE OBJECTIVES: The course is designed to expose students to some core topics in Microeconomics and widen the knowledge of students by building on the concepts introduced in Microeconomics - I. The course will

COURSE OUTCOMES:

CO1 Master decision-making in uncertain environments, and understand the dynamics of market equilibrium.

CO2 Identify and learn techniques to address market failures.

CO3

COURSE REQUIREMENTS: Successful completion of Mathematics for Economists (5000) and Microeconomics I (5101).

COURSE CONTENTS:

MODULE 1: DECISION MAKING UNDER UNCERTAINTY

The state-space model; Objective uncertainty and vN-M expected utility representation; The Mixture-Space theorem and proof; Savage's sure thing principle and subjective expected utility; Anscombe-Aumann representation; Utility for money and attitudes towards risk.

MODULE 2: GENERAL EQUILIBRIUM THEORY

Walrasian equilibrium: Properties; Existence of Walrasian equilibrium: Result and proof; Welfare theorems; Model with time and uncertainty (tentative); Radner equilibrium and its relation to Walrasian equilibrium (tentative).

MODULE 3: SOURCES OF MARKET FAILURE

Asymmetric Information; Moral hazard problem; Adverse selection problem; Externalities and Coase's Theorem.

EVALUATION: Weekly Quizzes (20%), Mid-Term Exam (40%), End-Term Exam (40%)

REFERENCES:

David M Kreps, *Microeconomic Foundations - I* (Chapters 5-6, 14-15), Princeton University Press, 2013.

Andreu Mas-Collel, Michael B. Whinston, and Jerry R. Green, *Microeconomic Theory* (Chapters 6, 15-17), Oxford University Press, 2006 (Indian Edition).

David M Kreps, *Notes On The Theory of Choice* (Chapters 4-7), Routledge, 1988.

INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH

MACROECONOMICS II

January-May 2025

Instructor I: Taniya Ghosh

Office: RB-II, Room 305

Tel. Ext: Phone 536(O)

Office Hours: By appointment only

Email: taniya@igidr.ac.in

Teaching Assistant:

Course Objectives: The course will provide an exposure to recursive techniques in both discrete and continuous time including their applications to growth, monetary theory and policy. This course will help you answer some “big” questions in macroeconomics. Why do economies grow over time, and how can they grow faster? Why are some countries rich and others poor? Why do we have business cycles? What is the cause of business cycles? How should monetary policy be conducted, and how should they react to short run fluctuations? Should central banks consider broader issues like climate change and inequality? The course will focus on the analysis, solution, calibration, estimation, and extension of DSGE models. We will work with these models in conjunction with data, discussing how to calibrate, estimate, and evaluate these models. Students will be expected to perform quantitative exercises using MATLAB and Dynare (which is a set of codes used to solve, simulate, and estimate DSGE models). The quantitative work will equip you to begin doing your own research in macroeconomics.

Grading Policy and Requirements: You are expected to attend ALL lectures, refer to the assigned readings, practice all assignments and sit for all exams/quizzes. Missed tests will be given a grade of zero unless a reasonable excuse is provided from the student office.

Course grade will be determined as follows:

Mid-term exam: 40%

Class Project (10%) and Quiz/Presentation (5%): 15%

Final exam: 45%

Recommended books for reference

Romer, D. (2005), Advanced Macroeconomics, 3rd Edition, McGraw-Hill.

McCandless, The ABCs of RBCs, George, Princeton University Press

J. Gali, Inflation, Employment and Prices.

C. Walsh, Monetary Theory and Policy, 2nd ed, The MIT Press.

Avinash Dixit, Optimisation in Economic Theory, OUP.

The Solow Growth Model

*Romer, Chapter 1

Solow R. “A contribution to the theory of economic growth” Quarterly Journal of Economics, 1956

Solow R. “Technical change and the aggregate production function”, Review of Economics and Statistics, 1957

Swan T. W. “Economic growth and capital accumulation” Economic Record, 1956

Real-Business-Cycle Theory and Extensions

*McCandless, Chapters 4, 5, 6

Romer, Chapter 3

Blanchard and Fischer, pages 277-283 and chapter 7

King R., Plosser, C. and Rebelo, S. “Production, Growth and Business Cycles: The Basic Neoclassical Model,” Journal of Monetary Economics 1988

Hansen G. “Indivisible Labor and the Business Cycle” Journal of Monetary Economics 1985

Kydland, F. and Prescott E. “Time to Build and Aggregate Fluctuations” Econometrics 1982

Long, J. and Plosser, C. “Real Business Cycles”, Journal of Political Economy 1983

The Basic New Keynesian Model

- **Interest Rate Rules and Determinacy**
- **Monetary Policy**
- **Zero Lower Bound**

Gali, J., Inflation, Employment and Prices, Chapters 1, 2 and 3

Blanchard, O. and S. Fischer (1989), Lectures on Macroeconomics. Chapter 4 and 11

Romer, D. (2005), Advanced Macroeconomics, 3rd Edition, Chapter 10

Bernanke Ben, Thomas Laubach, Frederic Mishkin, and Adam Posen (1999). Inflation Targeting: Lessons from the International Experience. Chapters 1 & 2.

Bernanke, B.S. and F. Mishkin (1997). Inflation targeting: A new framework for monetary policy? Journal of Economic Perspectives: pp 97-116

Clarida Richard, Jordi Gali, and Mark Gertler (1999). The Science of Monetary Policy: A New Keynesian Perspective, Journal of Economic Literature, pp 1661-1707.

Mishkin, F.S. (1995) Symposium on the monetary transmission mechanism, Journal of Economic Perspectives, pp 3-10

Kydland, Finn and Ed Prescott. "Rules Rather than Discretion: The Inconsistency of Optimal Plans." Journal of Political Economy, 1977.

Marvin Goodfriend (2007) How the World Achieved Consensus on Monetary Policy, Journal of Economic Perspectives, pp 47-68.

Ben S. Bernanke (2005) What Have We Learned Since October 1979? Federal Reserve Bank of St Louis Review, pp. 277-282.

New Keynesian Model Extensions

- **Environmental Policy in a New Keynesian Model**
- **Inequality in a New Keynesian Model**

Annichiariccho, B. and Dio, F. D (2015), "Environmental Policy and Macroeconomic Dynamics in a New Keynesian Model", *Journal of Environmental Economics and Management*, 69(1), 1-21.

Annichiariccho, B. and Dio, F. D (2017), "GHG Emissions Control and Monetary Policy", *Environmental & Resource Economics*, 67(4), 823-851.

Hansen, N. H., Lin, A., and Mano, R. C. (2020), "Should Inequality Factor into Central Banks' Decisions?", *IMF Working Paper*, WP/20/196.

INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH

SEMESTER: January – June, 2025

COURSE TITLE: Statistics & Econometrics-II

COURSE CODE / FIELD: 5302;

(3) Econometric Theory and Applications

INSTRUCTOR(S): Professor A. Ganesh-Kumar
(Teaching Assistant and Office Hours to be announced at the beginning of the semester)

COURSE DESCRIPTION:

This second core course on Econometrics at IGIDR builds upon the contents covered in Econometrics-I. The course will cover disturbance related regressions, simultaneous equations, qualitative choice models, limited dependent variable models and panel data models that are widely used in empirical analysis.

COURSE OBJECTIVES:

The course will aim at providing theoretical understanding of different models, their application in real life situations and implementation on statistical / econometric software.

COURSE OUTCOMES:

At the end of the course, it is expected that students should have the following skills:

CO1: Have a thorough under-standing of the theoretical foundations of empirical models.

CO2: Be able apply them to analyze real world problems.

CO3: Be able to use one or more statistical / econometrics software such as STATA, R.

COURSE REQUIREMENTS:

- i. Econometrics-I offered in IGIDR
- ii. Matrix Algebra

COURSE CONTENTS:

Module 1. Disturbance Related Regression Models

1.1. Modelling contemporaneous, time series and spatial correlations

1.1.1. Specification and interpretation

1.1.2. Estimation - the simple Case

1.1.3. Estimation - the general Case

1.1.3.1. The pure GLS estimator

1.1.3.2. The OLS estimator

1.1.3.3. The FGLS estimator

1.1.3.4. The iterated FGLS estimator

1.1.4. Inference and testing

1.1.4.1. Testing for structural change

1.1.4.2. Testing for equality of behaviour

1.1.4.3. Testing for aggregation bias

1.2. Models with unequal number of observations

1.3. Models with first-order autoregressive disturbances

Module 2. Simultaneous Equations Models

2.1. Specification and interpretation

2.1.1. The structural form

2.1.2. The reduced form

2.2. Identification by reduced form method

2.3. Identification by structural form method

2.4. Estimation of the complete structural model

2.4.1. Indirect least squares, 2SLS, and IV

2.4.2. Three stage least squares

2.4.3. Limited information maximum likelihood

2.4.4. Full information maximum likelihood

2.4.5. Properties of the estimates

Module 3. Qualitative & Limited Dependent Variables Models

3.1. Binary choice models

3.1.1. Linear probability model

3.1.2. Probit and logit models

3.2. Multiple choice models

3.2.1. Ordered response models

3.2.2. Unordered response models

3.2.3. Sequential response models

3.3. Censored (Tobit) regression models

3.4. Truncated regression models

3.5. Mixture of truncated and censored regression models

3.6. Duration / Hazard models

3.7. Selection models

Module 4. Panel Data Models

4.1. Introduction

4.1.1. Advantages of panel data

4.1.2. Issues involved in utilizing panel data

4.2. Models with intercepts that vary over individuals

4.2.1. Fixed effects models: dummy variable models

4.2.2. Random effects models: error component models

4.3. Models with intercepts that vary over individuals and time

4.3.1. Fixed effects models: dummy variable models

4.3.2. Random effects models: error component models

EVALUATION:

One Mid-term paper (30%) + Final written exam (50%) + Computer assignment (20%).

REFERENCES:

(use latest edition as far as possible – earlier editions are fine too)

A) Essential readings

Greene, W. H. Econometric Analysis, Prentice Hall, New Jersey.

Hsiao, C. Analysis of Panel Data, Cambridge University Press, Cambridge.

Johnston, J. and J. Dinardo Econometric Methods, McGraw-Hill Book Company, New York.

Maddala, G. S. Limited Dependent and Qualitative Variables in Econometrics, Cambridge University

Press, Cambridge.

B) Additional readings

Baltagi, B. H. Econometric Analysis of Panel Data, Chichester, John Wiley and Sons, New York.

Cameron, A. C. and P. K. Trivedi. Microeconometrics, Cambridge University Press, Cambridge.

Cameron, A. C. and P. K. Trivedi. Microeconometrics using STATA.

Judge G. G, W. E. Griffiths, R. C. Hill, H. Lutkepohl and T-C Lee. “The Theory and Practice of Econometrics, 2nd Ed.”, John Wiley, New York.

Kmenta, J. “Elements of Econometrics”, 2nd Ed., Maxwell Macmillan, New York.

Maddala G. S. “Econometrics of Panel Data, Vols. I and II”, Edward Elgar, England.

Srivastava, V. and A.E.D. Giles. Seemingly Unrelated Regression Equations Models: Estimation and

Inference, Marcel Dekker Inc., New York.

Wooldridge, J. M. Econometric Analysis of Cross Section and Panel Data. MIT Press.

Wooldridge, J. M. Econometrics, Cengage Learning.



INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH

COURSE TITLE: Development Economics

Semester: Jan-May 2025

Course Instructor: K.V.Ramaswamy

E-mail: swamy@igidr.ac.in

Tel: 511

Office Direct: 69096511

Course Timings: Tuesday and Thursday: 11.30 AM to 1 PM

Teaching Assistant: Krishna Kumar and Anas Khan

Course Introduction:

The basic intension is to introduce selected development issues and motivate analytical thinking in the area of development economics. Three focus areas are growth, inequality and poverty. Models of economic growth, the issue of convergence of nations and the role of determinants of growth will be discussed. The concept of dual economy, measurement of poverty and inequality in less-developed economies is another key focus. Recent applications of random experiments in development policy will be highlighted.

Course Outcomes [CO]:

The course aims to impart analytical skills necessary for development practitioners working in both government and non-government organizations. Upon completing the course, the students will be able understand and appreciate:

CO1: The key factors driving economic growth and structural transformation

CO2: The problem of economic inequality and poverty in developing economies in comparative development

CO2: The importance of econometric analysis for policy design and advice

Skills Imparted:

- Empirical Applications of Growth and Development models
- Use of cross-country data for development policy analysis
- How to analyse and understand the impact of government policy schemes?

Course Evaluation: In-class Tests (10%); Mid-Term (45%); End-term (35%);
Term paper (10%)

Academic Integrity: If we suspect violation of academic integrity then I reserve the right to give an F grade for the entire course.

Attendance: You are required to maintain 85 percent attendance. Else you will not be allowed to take the final examination.

Two basic text books:

Debraj Ray (1998), Development Economics, Oxford University Press, Delhi.

Alain de Janvry and Elisabeth Sadoulet (2016, 2021), Development Economics: Theory and Practice, Routledge, London.

Readings

1. Introduction to Economic Development and Basic Concepts

D.Ray-Chapter 2

Branko, Milonovic (2006): “Global Income Inequality: A Review”, *World Economics*, vol.7, No.1, page: 131-157

Gradín Carlos (2024). “Revisiting the trends in global inequality”, World Development, Volume 179, page 1-24, 2024

Human Development Indicators and Technical Note to HDR-1999 and 2016

Human Development Report 2010, Chapter 1 and 3

*McMillan, Rodrik, Sepulveda (2017), Structural Change, Fundamentals and Growth: A Framework and Case Studies, NBER working paper, No. 23378, <http://www.nber.org/papers/w23378>

1.2 Middle Income Trap

Chapter 1, World Development Report-2024, available at <https://openknowledge.worldbank.org/server/api/core/bitstreams/e91b7cdc-45fa-42e4-95d7-66499d872945/content>

UN DESA Policy Brief No. 155: Accelerating middle-income countries' progress towards sustainable development (2023)

PDF document available at: <https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/PB155.pdf>

1.3 Population and Development

Stanley A (2024),
<https://www.imf.org/en/Publications/fandd/issues/2023/09/PT-african-century>

Bloom, David. (2020).
<https://www.imf.org/en/Publications/fandd/issues/2020/03/changing-demographics-and-economic-growth-bloom>

2. Models and Empirics of Economic Growth: Old and New

2A: Theories of Economic Growth

D. Ray, Chapter 3

*Jones, C. (2016). The Facts of Economic Growth. In Taylor, J. B. and Uhlig, H., editors, Handbook of Macroeconomics, volume 2 of Handbook of Macroeconomics, chapter 1, pages 3--69. Elsevier. Sections 4.6-4.7

*Mankiw, Romer and Weil (1992), “A Contribution to the Empirics of Economic Growth”, *Quarterly Journal of Economics*, 107, pp407-437

Xavier X. Sala-i-Martin (1996), “The Classical Approach to Convergence Analysis”, *The Economic Journal*, Vol. 106, No. 437 (Jul., 1996), pp. 1019-1036

2B New Growth Theories

D.Ray, Chapter 4

*Almeida, Derick & Naudé, Wim & Sequeira, Tiago Neves, 2024. "Artificial Intelligence and the Discovery of New Ideas: Is an Economic Growth Explosion Imminent?," IZA Discussion Papers 16766, Institute of Labor Economics (IZA)

2C TFPG and Determinants of Growth

D.Ray. Chapter 4, pp117-123

Easterly, William and Ross Levine, "It's not factor accumulation: stylized facts and growth models", *World Bank Economic Review*, Volume 15, Number 2, 2001

3. History and Institutions;

Acemoglu, Daron., Simon Johnson, and James Robinson. (2001). "Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review*, 91 (5), 1369-1401.

Anderson, Siwan. 2011. "Caste as an Impediment to Trade." *American Economic Journal: Applied Economics*, 3(1): 239-63

Ron Alquist, Benjamin R. Chabot, Ram Yamarthy (2022),
The price of property rights: Institutions, finance, and economic growth,
Journal of International Economics, Volume 137, July 2022, Article number 103594,

<https://doi.org/10.1016/j.jinteco.2022.103594>

* Bruhn, Miriam, and Francisco A. Gallego. (2012). "Good, Bad, and Ugly Colonial activities: Do they matter for economic development?" *The Review of Economics and Statistics*, 94, no. 2 (2012): 433–61.
<http://www.jstor.org/stable/23262081>.

4. The Economics of Dual Economy and Structural Transformation

Debraj Ray, Chapter 10

Pranab Bardhan and C.Udry -Development Micro Economics, Oxford University Press, 1999, Chapter 5 (Migration)

5. Inequality, Poverty and Development

5A Measurement of Inequality and Poverty:

“Haddad, Cameron Nadim; Mahler, Daniel Gerszon; Diaz-Bonilla, Carolina; Hill, Ruth; Lakner, Christoph; Lara Ibarra, Gabriel. 2024. The World Bank’s New Inequality Indicator: The Number of Countries with High Inequality. Policy Research Working Paper; 10796. © Washington, DC: World Bank. <http://hdl.handle.net/10986/41687> License: CC BY 3.0 IGO

Inequality: D.Ray, Chapter 6;

*Xiao, A., Xu, Z., Skare, M. et al. Bridging the digital divide: the impact of technological innovation on income inequality and human interactions. *Humanit Soc Sci Commun* 11, 809 (2024). <https://doi.org/10.1057/s41599-024-03307-8>

Poverty: Debraj Ray: Chapter 8

5B. Interconnections:

D.Ray, Chapter 7

de Janvry and Sadoulet , Chapter 6

Galor, Oded, 2000. "[Income distribution and the process of development](https://doi.org/10.1016/S0014-2921(99)00039-2)," *European Economic Review*, Elsevier, vol. 44(4-6), pages 706-712, May, [https://doi.org/10.1016/S0014-2921\(99\)00039-2](https://doi.org/10.1016/S0014-2921(99)00039-2)

*Deininger and Squire (1998), “New Ways of Looking at Old Issues: Inequality and Growth”, *Journal of Development Economics*, Vol.58, pp259-287

*Aiyar S, Ebeke C (2020) Inequality of opportunity, inequality of income, and economic growth. *World Development*, 136:105–115
<https://doi.org/10.1016/j.worlddev.2020.105115>

Klaus Gründler, Philipp Scheuermeyer (2018), “Growth effects of inequality and redistribution: What are the transmission channels?”, *Journal of Macroeconomics*, Volume 55, 293-313, <https://doi.org/10.1016/j.jmacro.2017.12.001>

6. Poverty, Agriculture and Employment Guarantee Programmes

Asher, Sam, and Paul Novosad. 2020. "Rural Roads and Local Economic Development." *American Economic Review*, 110 (3): 797-823.

Datt, Gaurav and Martin Ravallion, (1998), "Farm Productivity and Rural Poverty in India", *Journal of Development Studies*, Vol.34, No.4, April, pp.62-85

Imbert, C., and J. Papp. 2015. 'Labor market effects of social programs: Evidence from India's employment guarantee'. *American Economic Journal: Applied Economics*, 7 (2): 233-63.

7. Microfinance and Development

de Janvry and Sadoulet, Chapter 13

Emily Breza, Cynthia Kinnan, Measuring the Equilibrium Impacts of Credit: Evidence from the Indian Microfinance Crisis, *The Quarterly Journal of Economics*, Volume 136, Issue 3, August 2021, Pages 1447–1497.

Banerjee, Abhijit, Esther Duflo, Clément Imbert, Santhosh Mathew, and Rohini Pande. 2020. "E-governance, Accountability, and Leakage in Public Programs: Experimental Evidence from a Financial Management Reform in India." *American Economic Journal: Applied Economics*, 12 (4): 39-72.

8. Conditional Cash Transfer (CCT) Versus Unconditional Transfer Programs

Gertler, Paul J., Sebastian W. Martinez, and Marta Rubio-Codina. 2012. "Investing Cash Transfers to Raise Long-Term Living Standards." *American Economic Journal: Applied Economics*, 4 (1): 164–92.

Johannes Haushofer, Jeremy Shapiro, The Short-term Impact of Unconditional Cash Transfers to the Poor: Experimental Evidence from Kenya, *The Quarterly Journal of Economics*, Volume 131, Issue 4, November 2016, Pages 1973–2042.

Sarah Baird, Craig McIntosh, Berk Özler, Cash or Condition? Evidence from a Cash Transfer Experiment, *The Quarterly Journal of Economics*, Volume 126, Issue 4, November 2011, Pages 1709–1753.

9. Women, Work and Development

Mammen, Kristin, and Christina Paxson. 2000. 'Women's Work and Economic Development.' *Journal of Economic Perspectives*, 14(4): 141-1646

Rachel Heath, A. Mushfiq Mobarak. 2015. "Manufacturing growth and the lives of Bangladeshi women, *Journal of Development Economics*, 115 (July),pp.1-15,

10. Schooling and Health

Burde, Dana, and Leigh L. Linden. 2013. "Bringing Education to Afghan Girls: A Randomized Controlled Trial of Village-Based Schools." *American Economic Journal: Applied Economics*, 5(3): 27-40

Muralidharan, Karthik, and Nishith Prakash. 2017. "Cycling to School: Increasing Secondary School Enrollment for Girls in India." *American Economic Journal: Applied Economics*, 9 (3): 321-50.

Tanika Chakraborty and Rajshri Jayaraman (2019), "School feeding and learning achievement: Evidence from India's midday meal program", *Journal of Development Economics* 139 (2019) 249–265

References:

Handbook of Development Economics (2010): Volume Five,
DANI RODRIK and MARK ROSENZWEIG (editors), Elsevier-North Holland.

INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH

SEMESTER: January-June 2025

COURSE TITLE: Introduction to Energy Studies

INSTRUCTOR: Manisha Jain

TEACHING ASSISTANT: Nirmala

COURSE DESCRIPTION: This is a new course introduced for students enrolled in PhD in energy environment and climate change at IGIDR. Energy studies include a wide range of topics, and in this course, the objective is to introduce these topics to the students so that they can undertake research in this field. These topics can be categorized into science, technology, markets, economics, and policy. Research in this field includes a wide range of research questions using a variety of datasets and methods to address the growing challenges in meeting energy and environment objectives. This course will provide a foundation for research in this field. Energy is required for economic growth and social welfare. However, the current energy system is causing environmental degradation. The primary purpose of energy research is to find ways to maximize growth and minimize environmental impact. In addition to covering the fundamental concepts in energy, this course will expose students to contemporary research questions on energy, the environment, and development.

COURSE OBJECTIVES:

Build a perspective on how and where energy studies are placed in the discussions on economic growth, sustainable development and climate change.

Familiarise with the technical and scientific terminologies commonly used in energy studies and using different energy units, studying energy flows involving different energy sources.

Introduce students to various technologies used in the energy system, including technology used for mining and exploration generation transformation and consumption.

Introduce techniques of economic analysis of energy technologies

Examine the challenges and opportunities in the current global and Indian energy system

COURSE OUTCOMES:

- CO1 – Students will learn to establish a connection between energy environment and climate change with economic growth and sustainable development
- CO2 – Students will be equipped to deal with different energy units and different energy sources to establish energy flows in any system economy or globally
- CO3 – Students will be exposed to technologies that are relevant for the much-required energy transition to meet the climate challenge
- CO4 – Students will develop expertise in undertaking economic analysis of energy technologies, which are essential for analyzing the costs and benefits of energy transitions
- CO5 - students will also develop the necessary foundation for undertaking research in energy environment and climate change-related topics

COURSE REQUIREMENTS: None

EVALUATION:

Quizzes and presentations: 30%

Term paper: 40%

Final paper: 30%

INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH

SEMESTER: January-June 2025

PROPOSED COURSES BY V. K. SHARMA

COURSE TITLE: INTRODUCTION TO ENVIRONMENTAL STUDIES

COURSES' DESCRIPTION: Eligibility Ph.D. (EE) Students admitted in Aug.2024.

COURSES' OBJECTIVES: To create human resources for enhancing academic and research in the Areas of Energy and Environment (**EE**)

COURSES' OUTCOMES:

CO1: Learning the basic concepts and generating interest in various topics of EE

CO2: Exposure to Advanced concepts in EE

CO3: Hands on experience of conducting a good quality research in the area of EE

COURSES' REQUIREMENTS: Good computer knowledge (command over MS Office, at least); good English writing / reading / speaking skills; Research Aptitude

COURSES' EVALUATION: Based on – 1) Mid Term Exam = 30-40%; 2) Weekly progress on Research Paper (RP) = about 20-10%; and 3) Presentation of RP and submission of hard and soft copies of RP = 50% and/ or Final Exam.

COURSE CONTENTS:

Local Environmental Issues- Problems of Air, Water, Solid Waste, Noise, Radiation, Land degradation, etc.; Sources and Effects of Pollution; Scientific/ Technological and Socio-Economic Concepts; Monitoring and Modelling of Pollution; Abatement measures- source/ receptor control; technological and economic measures; Sustainability and Tools for its Assessment - CBA, EIA and LCA; Natural and Environment Resource Accounting, SEEA of the UN; Resources' Conservation and Environmental protection.

Global Environmental Issues- Global and trans-boundary issues in Energy and Environment; Comparison of Environmental Problems in Developed and Developing Countries; Climate Change and its Possible Impact - Problem of Food Security; Impact on Water Resources - Changes in Monsoon Patterns; Socio-Economic Impacts- Sea Level Rise, Land Submergence and Shifting of Coastal Communities, Impact on Shore line Infrastructure and Coastal Resources; International Efforts for protecting global environment – UNFCCC; IPCC, GEF, UNDP, WB, COPs, IPCC, etc.

REFERENCES:

- Divan S. and Rosencranz A. (2001): Environmental Law and Policy in India, OUP, New Delhi.
- George T., Hilary T. and Samuel A(1993): Integrated Solid Waste Management, McGRAW-Hill Inc.
- H. C. Perkins (1981): Air Pollution, John Willey.
- Handouts, PPTs, etc. provided to the student by the instructor.
- MetCalf and Eddy (2002), Wastewater treatment – collection, treatment and disposal, Tata McGraw Hill Publishers.
- Perkins, HC (1974): Air Pollution, McGraw Hill Publishing Co., New York., 1974
- Pearce D., A. Markandya and E. Barbier (1989): Blueprint for a Green Economy, Earthscan Publications Ltd., London.

- Pearce, D (1994): Environmental Economics: An Elementary Introduction, Harvester Wheatsheaf, New York, 1994
- Report on "Trade and Environment Linkages," IGIDR, 2005
- Report on "Natural Resource Accounting," IGIDR, 2003
- Sharma V. K.(1994): Atmospheric Pollution by Aerosols, Scientific Publishers, Jodhpur.
- Sharma Vinod K. and Beukering P. V.(1997): Waste paper Trade and Recycling in India, Scientific Publishers, Jodhpur.
- Sharma Vinod. K (2000): Environmental Problems of Coastal Areas in India, Bookwell, Delhi.
- Sharma Vinod. K (2004): Handbook of Environment, Bookwell, Delhi.
- Sharma Vinod K. (2007): Maharashtra State Development Report, Oxford University Press and Planning Commission.
- Thomann, RV (1987): Principles Of Surface Water Quality Modeling and Control: Harper and Row Publishers, NY,, 1987
- Turner R.K., D. Pearce and I. Batman (1994): Environmental Economics, Harvester Wheatsheaf.
- Tietenberg, Tom (2003): Environmental and Natural Resource Economics (6th ed), Addison Wesley, Boston, 2003 .
- Various Policy Reports and Websites of International / National Organizations, suggested by the instructor.