**Dire Dawa University**

**School of Business and Economics**

**Department of Economics**

****

**MSc. in** “Environmental & Natural Resource Economics”

**Economics Department Curriculum Committee**

**January, 2014**

**Dire Dawa, Ethiopia**

**List of Courses**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.No.** | **Course Name** | **Course Code** | **Cr. Hrs** | **Course Type** |
| 1 | Mathematical Economics | Econ 511 | 3 | Common |
| 2 | Advanced Microeconomics | Econ 512 | 3 | Common |
| 3 | Advanced Macroeconomics | Econ 513 | 3 | Common |
| 4 | Environmental and Natural Resource Economics | Econ 581 | 4 | Core |
| 5 | Environmental Valuation and Policy | Econ 582 | 3 | Core |
| 6 | Climate change Economics and Policy | Econ 683 | 3 | Core |
| 7 | Advanced Econometrics Theory and Application | Econ 531 | 4 | Common |
| 8 | Research Methods for Economists | Econ 532 | 2 | Common |
| 9 | Institutional Economics | Econ 541 | 3 | Common |
| 10 | Economics of Agriculture & Rural Development | Econ 651 | 3 | Elective |
| 11 | Project Design and Analysis | Econ 661 | 3 | Elective |
| 12 | Seminar in Environmental and Natural Resource Economics | Econ 691 | 1 | Core |
| Total | | | 32 |  |
| 13 | Master Thesis | Econ 692 | 6 | Core |

**NB:** Master thesis includes proposal and main research

1. **Course Breakdown over Years and Semesters**

**Year I semester I**

|  |  |  |  |
| --- | --- | --- | --- |
| Course title | Course code | Credit hour | Type |
| Mathematical economics | Econ511 | 3 | Common |
| Advanced Microeconomics | Econ 512 | 3 | Common |
| Advanced macroeconomics | Econ 513 | 3 | Common |
| Environmental and Natural Resource Economics | Econ 581 | 4 | Core |
| Total | | 13 |  |

**Year I Semester II**

|  |  |  |  |
| --- | --- | --- | --- |
| Course title | Course code | Credit hour | Type |
| Institutional Economics | Econ 541 | 3 | Common |
| Environmental Valuation and Policy | Econ 582 | 3 | Core |
| Climate change Economics and Policy | Econ 583 | 3 | Core |
| Advanced Econometrics Theory and Application | Econ531 | 4 | Common |
| Research Methods for Economists | Econ532 | 2 | Common |
| Total | | 15 |  |

**Year II Semester I**

|  |  |  |  |
| --- | --- | --- | --- |
| Course title | Course code | Credit hour | Type |
| Seminar in environmental and natural resource economics | Econ 691 | 1 | Core |
| Project design and analysis | Econ 661 | 3 | Elective |
| Economics Agriculture and Rural Development | Econ 651 | 3 | Elective |
| Total | | 4 |  |
| Master Thesis | Econ 692 | 6 | Core |

**Year II Semester II**

|  |  |  |  |
| --- | --- | --- | --- |
| Course title | Course code | Credit hours | Type |
| Master Thesis | Econ 692 | 6 | Core |

**NB:** The elective courses will be delivered if at least five students choose it.

1. **Course Descriptions, Modes of Delivery, Assessment**

**Econ 511: Mathematical Economics**

**Classification:** Common **Number of Credits:** 3

**Course Objectives**

The general purpose of the course is to enable students understand the necessary mathematical concepts for Economics and apply them in economic models of the national economy. The specific objectives are as follows:

* To equip the students with knowledge and skills to enable them apply Mathematics in economic analyses;
* To facilitate the student to carry out both quantitative and qualitative analysis of economic systems; and
* To provide a framework for enabling the student to see the application of mathematical techniques to economics through examples.

1. **Expected Learning Outcomes**

At the end of the course, the student will be able to:

* Apply concepts of functions and linear algebra in developing and using basic economic models;
* Apply calculus techniques (differential and integral) in maximization and minimization problems as well as marginal analysis and elasticity;
* Apply differential and difference based techniques in developing dynamic economic models;
* Identify and solve optimization problems in Agricultural Economics using various optimality criteria based on deterministic functions; and
* Solve optimization problems for dynamic systems using various optimality criteria

1. **Prerequisites**

The student should have covered basic courses inclusive of the following aspects:

􀁸 **Elementary matrix algebra and linear equations and inequalities:** Sets and set operations, basic matrix operations and inversions, properties of matrices, vectors and vector operations, input-output concept, graphical representation of equations, solutions to simultaneous linear equations, simple national income models, demand and supply curves, roots of the quadratic equation, break-even point, discontinuous functions.

􀁸 **Series:** Arithmetic and geometric progressions, exponential series and logarithms, discounting, annuities and sinking funds, Taylor and Maclaurin’ series and theorems.

􀁸 **Calculus:** Concept of derivatives as applied to elasticity of demand, maxima and minima, profit maximization, partial differentiation, basic integration techniques as related to consumer surplus and producer surplus.

1. **Course Description**

**Topic 1: Application of Sets, Functions and Linear Algebra in Economics**

􀁸 Review of Matrix algebra and its applications, linear spaces and subspaces, convex and quasi-convex sets, interior and relative interior of convex sets, dimensions of convex sets, hyper-planes and extreme points of convex sets, review of series, continuity, differentiability and sub-differentiability of convex functions.

􀁸 Linear systems and examples of linear models (linear models for production, Markov models of employment etc.), systems of linear equations, economic applications (budget sets in commodity space, the investment model e.t.c.).

􀁸 Portfolio analysis, activity analysis (for example, efficiency, Leontief Models, feasibility analysis) and Taylor Polynomials.

**Topic 2: Application of Differential and Integral Calculus in Economics**

􀁸 Review the rules of differentiation, implications of differentiation in economics, applications to cost and revenue analysis, profit maximization in several markets, maximization of tax revenue.

􀁸 Review the rules of integration, implications of integration in Economics, calculation of areas between curves, numerical methods of integration, producer and consumer surplus.

􀁸 Review partial differentiation, total derivatives, implicit differentiation, maxima and minima, marginal analysis and elasticity of demand.

**Topic 3: Application of Differential and Difference Equations**

􀁸 Ordinary differential equations of the first and second order, homogeneous and non-homogeneous differential equations, existence and uniqueness of solutions of differential equations, concepts of partial differential equations and their applications, and systems of differential equations.

􀁸 First and second order difference equations, systems of difference equations, economic models that emerge from difference equations such as cobweb model, compound interest and capital addition, consumption-investment models, and inflation unemployment model.

􀁸 Concepts of stability and instability, stability and instability theorems, conditions for stability, stability tests, application to stability of price regulation process, indirect money metric utility functions and converse of Euler’s theorem.

**Topic 4: Elements of Linear and Non-Linear Programming**

􀁸 Application of convex set theory to programming, Lagrange function and its saddle points, duality and its implications, pairs of dual problems in Convex Programming (CP), Sleiter condition, Kuhn-Tucker theorem for CP, necessary and sufficient conditions for optimality for CP in differential form.

􀁸 Application of quasi-convex functions to optimisation problems, necessary and sufficient conditions for optimality as applied to efficient resource use, utility maximization problems subject to budgetary constraints.

􀁸 Linear programming and optimality conditions, general problems of linear and non-linear programming, local and global optimality, regularity conditions for constraints, Kuhn- Tucker theorem for smooth non-linear programming problems, theorems of marginal values for CP problems and their economic interpretation.

􀁸 Differentiability of solutions and Lagrange multipliers of linear and non-linear programming problems, relations to marginal values.

􀁸 Applications to the theory of demand using utility functions, demand functions and Slustky equation (decomposition of demand and supply), other economic models such as those based on dynamic programming.

**Topic 5: Optimization and Dynamic Analysis**

􀁸 Constrained and unconstrained optimizations (first and second order conditions, global maxima and minima, economic applications such as profit maximization and cost minimization, discriminating monopolist, equality and inequality constraints, mixed constraints), constrained optimisation (multiplier, envelope theorems, bordered Hessian condition), homogeneous and homothetic functions.

􀁸 Maximum principle as a necessary condition for optimality in finite interval for discrete and continuous time, example of model of planning with finite horizon, Ramsey’s model on infinite interval, model of optimal economic growth in discrete time, calculus of variations in continuous time, Euler equations as first order extremum condition, relationship between maximum principle and Kuhn-Tucker theorem in discrete case, Pareto optimality and necessary and sufficient conditions.

􀁸 Optimization over time

􀁸 Dynamic optimization: Discrete time dynamics, Theory of optimal control, Calculus of variation, and Current value of Hamiltonian.

**6. Mode of Delivery**

Each student will be expected to spend at least 3 hours of independent study for every contact hour on each topic. Practicals will focus on application of the techniques to specific cases in agricultural economics as well as use of computer programs for analysis. Seminars will involve presentations of review and application on particular topics by each student for peer review. The Contact hours will be three lecture hours per week and one practical (math lab) hour per week for a total of 15 weeks.

**7. Assessment Method**

This will be through assignments & mid-term test (20%), term paper/project (30%) and final examination (50%).

**8. Course Materials**

**Recommended Textbooks**

1. Chiang, A.C. (1984). *Fundamental Methods of Mathematical Economics*. 3rd ed., London: McGraw-Hill Book Company.
2. Silberberg, E. & W. Suer, 2001. *The Structure of Economics: a Mathematical Analysis* 3rd edition, McGraw Hill Book co.
3. Simon, C. P., and Blume, L. (1994 or latest edition). *Mathematics for Economists*. W. W. Norton & Company.

**Further Readings**

1. Samuelson, P. (1983). *Foundations of Economics Analysis.* London: Harvard University Press.
2. Timbrell, M. (1990). *Mathematics for Economists.* Oxford: Basil Blackwell.
3. Weintraub, R. (1990). *Mathematics for Economists - An integrated Approach.* Cambridge: Cambridge University Press.
4. Journalarticles illustrating the use of mathematics in developing conceptual models which are then linked to empirical analyses

**Econ 512: Advanced Microeconomics**

**Classification:** Common **Number of Credits:** 3

**Course Objectives**

This course provides a theoretical foundation in Economics and its application for almost all other courses in the program. Specifically, the course is intended to enable students:

* Acquire and use the language and logic of microeconomic theories of the consumer and the firm;
* Apply microeconomic theories to problems of agriculture, rural development, and the environment; and
* Acquire knowledge of the practical uses of Microeconomics in research and management.

1. **Expected Learning Outcomes**

By the end of the course, students should be able to:

* Apply the Lagrangian technique of constrained optimization;
* Derive and apply individual demand functions;
* Derive the market demand functions;
* Derive elasticity’s and apply them;
* Explain Pareto optimum conditions;
* Show the gains from exchange using the Edge worth Box;
* Understand the fundamental theorems of welfare economics and application;
* Analyze the behavior of the firms

1. **Prerequisites**

Students enrolled for this course are expected to have acquired competence in undergraduate Microeconomics and Mathematics. In Microeconomics, mastery up to the intermediate undergraduate level is expected. In Mathematics, students are expected to have a working knowledge of Algebra, Analytic Geometry, and Differential Calculus.

1. **Course Description**

An in-depth study of microeconomic theory and its applications as represented by published articles in academic journals and other contemporary literature. Topics may include individual decision making of the consumer and the producer, market analysis and welfare economics and analysis.

**Part I: Individual Decision Making**

**Topic 1: Consumer Theory**

* 1. Introduction
  2. Consumption set and Budget constraint
  3. Preference and Utility
  4. Utility Maximization and Optimal choice
  5. Indirect Utility, Expenditure and money metric utility function, and Some important Identities
  6. Dual Utility direct and indirect utility
  7. **Properties of consumer demand**
* Income changes and consumption choice
* Price changes and consumption choice
* Income-substitution effect; Slutsky and Hicks equation
* Continuity and differentiability of demand function
* Inverse demand function
  1. **Reveled Preference**
  2. **Topics in demand Behavior**
* Endowments in the budget constraint
* Income – Leisure choice model
* Homothetic utility functions
* Aggregating across goods
* Aggregating across consumers
  1. **Elasticity of Demand Functions**
* Cross-price elasticity of demand
* Elasticity’s for various types of demand functions
* The relationship between price elasticity and total revenue for linear demand functions
* Elasticity of substitution in consumption

**Topic 2: Theory of the Firm**

* 1. Production Technology
  2. Profit Maximization
  3. Cost and Profit Functions
  4. Cost Minimization
  5. Relating Demand Functions to Profit Functions

**Topic 3: The Problem of Choice in Situations Involving Risk**

* 1. The Axioms
  2. Expected utility
  3. Attitudes towards risk
  4. Risk and insurance

**Part II: Strategic Behavior and Market**

**Topic 4: Game Theory**

* 1. Introduction
  2. Description of a Game
  3. Solution concepts
  4. Repeated Game
  5. Refinement of Nash Equilibrium
  6. Games with Incomplete information

**Topic 5: Market Analysis**

* 1. Perfect competition
  2. Pure Monopoly
  3. Monopolistic Competition
  4. Oligopoly
  5. Monopsony

**Part III: General Equilibrium Theory and Social Welfare**

**Topic 6: Consumption Efficiency and Gains from Exchange**

* 1. Partial Equilibrium analysis
  2. The structure of general equilibrium analysis

**Topic 7: Theory of Welfare**

* 1. Pareto Efficiency of Allocation
  2. First fundamental theorems of welfare economics
  3. Second fundamental theorems of welfare economics
  4. Non-convex production Technologies and Marginal cost pricing
  5. Pareto Optimality and Social welfare maximization
  6. Political overtones

**6. Mode of Delivery**

The course materials will be delivered through lectures, reading and homework assignments. There will be 3 contact hours per week and 9 hrs of independent study per week for the 16-week semester.

**7. Assessment Methods**

The following assessment methods will be used:

* Assignments & Continuous Assessment Tests (CATs) 20%
* Project/term paper 30%
* Final examination 50%

The assignments will consist of theoretical and applied microeconomic problems to be solved by the students. The CATs will be based on the lectures, readings, and homework assignments. The final examination will test knowledge gained throughout the course.

**8. Course Materials**

**Recommended Textbooks**

* Nicholson, Walter. 2002. *Microeconomic Theory: Basic Principles and Extensions,* 8th Edition. London: South-Western (Thomas Learning).
* Hal. Varian, (1992), Microeconomic Analysis 3rd Ed. W.W.W. Notern & Compancy, INC. New york
* Henderson, J.M., and R.E. Quandt. 1980. *Microeconomic Theory: A Mathematical Approach*, 3rd Edition. London: McGraw Hill.

**Further Readings**

* Baumol, William J. 1999. *Economic Theory and Operations Analysis*, 4th Edition. New Delhi: Prentice-Hall of India.
* Binger, Brian, and Elizabeth Hoffman. 1998. *Microeconomics with Calculus*, 2nd Edition.
* Reading, Massachusetts: Addison-Wesley.
* Chiang, Alpha C. 1985. *Fundamental Methods of Mathematical Economics*. London: McGraw Hill.
* Dowling, Edward T. 2001. *Schaum’s Outline: Introduction to Mathematical Economics*. 3rd Edition. New York: McGraw-Hill.
* Harkwick, P., B. Khan, and J. Langmead. 1996. *An Introduction to Modern Economics*, 4th Edition. New York: Addison Wesley Longman Publishing.
* Lipsey, R. G., and K. A. Christal. 1999. *Principles of Economics*, 9th Edition. Oxford University Press.
* Salvatore, Dominick. 1992. *Schaum’s Outline of Theory and Problems of Microeconomic Theory*. 3rd Edition. New York: McGraw-Hill.
* Silberberg, E. & W. Suer, 2001. *The Structure of Economics: a Mathematical Analysis* 3rd edition, McGraw Hill Book co.
* Wetzstein, Michael. 2004. *Microeconomic Theory: Concepts and Connections with Economic Applications*. South-Western College Publishers.

**Econ 513: Advanced Macroeconomics**

**Classification**: Common **Credits Hours**: 3

**Course Objectives**

This course is an advanced treatment of macroeconomic theory, models, practice, and policies. The course presents a critical review of both mainstream and structuralist macroeconomic traditions. The relevance of the forgoing to the contemporary world of developed and developing countries, specifically to the African context will be adequately emphasized.

The objectives of the course are:

* To develop a thorough knowledge of different approaches in Macro-Economics;
* Develop a critical perspective in macroeconomics theory and applications;
* Expose the students to the nature and importance of linkages between agriculture and the macro-economy; and
* Examine theories and methods as applied in developing countries

1. **Expected Learning Outcomes**

At the end of the course the students are expected to:

* Understand the structure of a macroeconomic system and the underlying theoretical framework as well as controversies and debates;
* Apply methodology and techniques studied in conceptualizing macro-economic issues;
* Analyze relevant macroeconomic policies and issues, especially those that relates to agriculture; &
* Evaluate macroeconomic policies and their impacts in contemporary developing countries.

1. **Prerequisites**

Students will be required to have completed at least upper undergraduate Macroeconomics. The student should have covered IS-LM analysis, open economy macroeconomics and growth theories. Those not meeting the prerequisite should take remedial courses in preparation. Mathematical Economics at undergraduate especially Calculus and Matrix Algebra is required and should also be taken as a remedial course if prerequisite is not met.

1. **Course Content**

**Topic 1: Aggregate Demand and Aggregate Supply**

* 1. The aggregate labour market
  2. Aggregate Demand: Review of the IS-LM Model
  3. Schools in macroeconomics

**Topic 2: Dynamics in Aggregate Demand and Supply**

* 1. The adaptive expectations and stability analysis
  2. Investment, capital stock and stability
  3. Wealth effects and the government budget constraints

**Topic 3: Real Business Cycle**

* 1. Introduction
  2. Theories of Economic fluctuations
  3. Baseline Real business cycle model
  4. Household Behavior
  5. Solving the model in general case
  6. Implications

**Topic 4: Consumption and Saving Theories and Application**

* 1. Keynesian Consumption Function
  2. Life- Cycle Hypothesis
  3. Consumption under Certainty: Permanent Income Hypothesis
     1. Saving and Consumption
  4. Consumption under uncertainty: Random Walk Hypothesis
     1. Interest rate and saving
     2. Interest Rate and Consumption Growth
  5. Consumption and Risky Assets
  6. Beyond Permanent Income Hypothesis
     1. Buffer-stock saving
     2. Precautionary saving

**Topic 5: Investment of Theories**

* 1. Investment and cost of Capital
  2. Model of Adjustment with Adjustment Cost
  3. Tobin’s ‘q’ model of Investment
  4. Uncertainty and Investment
  5. Financial Market Imperfection and Investment

**Topic 6: Rational Expectations and Economic Policy**

* 1. Some Facts about Economic Fluctuations
  2. Theories of fluctuations
  3. Baseline in Real Business Cycle Model
  4. Household Behavior
  5. Empirical applications
  6. Policy Imperfection with rational Expectation

**Topic 7: Open Macroeconomic Theories**

* 1. National Income and Monetary Accounting
  2. Open Economy IS-LM-BP Model
  3. Capital Mobility and Economic Policy
     1. Immobile Capital and Fixed Exchange Rates
     2. Perfectly Mobile Capital and Fixed Exchange Rates
     3. Perfect Capital Mobility and Flexible Exchange Rates
  4. Extended Mundell-Fleming Model
  5. Comparative Static Effects
  6. Economic Policy and the World Economy
     1. Wage Rigidity and Economic policy
     2. International Policy Coordination

**Topic 8: Growth Models and Economic Growth Analysis**

* 1. Harrod-Domar model
  2. The neoclassical growth model
  3. Endogenous growth models.

**Topic 9: Unemployment**

* 1. The Generic Efficiency wages
  2. The Shapiro-Stieglitz model
  3. The Implicit Contracts
  4. Search Matching Model

**Topic 10: Macroeconomics Policies**

* 1. Inflation and Monetary Policy
  2. Budget Deficit and Fiscal Policy

1. **Mode of Delivery**

Being a graduate course, delivery will combine both lectures and seminars. Students will be required to select topics for which they present and write terms papers as well as having regular lectures on each topic. The specific teaching aids required are overhead projectors and white boards for presentation of material. The course shall carry a total of 3 credit hours. Each week students will devote a minimum of 3 contact hours to this course. In addition, the students shall also do some independent work, which will be 9 hours of work.

1. **Assessment Methods**

Assessment shall be by combination of a test, a term paper and two assignments. There will also be a final examination whose weight will be 50% of the total assessment. The distribution of the rest of the 50 percent of the continuous assessment shall be, 20 percent for test and assignments and 30 percent for term paper. The timing of each assessment is left to the individual lecturer so as to maintain some flexibility.

1. **Course Materials**

**Recommended Textbooks**

* Romer, D. (2006), *Advanced Macroeconomics*, 3rd Ed. New York: McGraw Hill. \*
* B. J. Heijdra & F. van der Ploeg, (), Foundations of Modern Macroeconomics
* Branson, William H. (1989) *Macroeconomic Theory and Policy*, 3rd Harper & Row, Publishers, New York, Chaps 2, 3, 4 and 5\*.
* Jones, Charles I. *Introduction to Economic Growth*

**Further Readings**

- A. Hanson (1953) *A Guide to Keynes,* New York: McGraw- Hill.

- A.C Pigou (1943)’ The Classical Stationary State ‘ *Economic Journal*, 53, December\*

- Adepoju, A. (Ed.). *The Impact of Structural Adjustment on the Population of Africa.* London: Great Britain by Villiers Publications. 1993.

- Agenor, Paul and P.J. Montiel (2000), *Development Macroeconomics*, Princeton University Press.

- Agenor, P-R. (1990) “Stabilisation Policies in Developing Countries with a Parallel Market for Foreign Exchange: A Formal Framework” *IMF Staff Papers*, September.

- Aghion, P. and P. Howitt, *Endogenous Growth Theory*. Cambridge: MIT Press.

- Alberto Arce (2003): ‘Value Contestations in Development Interventions: Community Development and Sustainable Livelihoods approaches’, *Community Development Journal* 38: 199-212

- Alchian, A. (1955) “The Rate of Interest, Fisher’s rate of return over Costs and Keynes’ Internal Rate of Return” *American Economic Review*, December\*

**Econ 531: Advanced Econometrics Theory and Application**

**Classification:** Common **Number of Credits:** 4

1. **Course Description**

Social scientists are often interested in quantifying relationships between different variables. The objective of Econometrics is thus to quantify such relationships using available data and statistical techniques to interpret and use the resulting outcomes. So, Econometrics is the application of statistical and mathematical methods to the analysis of economic data, with the purpose of giving empirical content to economic theories and then verifying or refuting them. Bridging the gap between theory and policy analysis requires acquiring the practice of applying the concepts, theories and methods of Economics to policy analysis. This Econometrics course is designed to meet this challenge by providing insights on how the three elements of Econometrics namely: economic theory, mathematical economics and statistical procedures can be combined, to provide useful information to policy analysts and decision makers. In addition, the course will give insight the application of software packages like STATA, EVIEWS and PCGIVE.

1. **Course Objectives**

The objective of the course is to equip students with the knowledge and skill of econometrics and able to read, analyze and conduct empirical investigations in the field of economics. Therefore, the objectives of the course are to:

* Develop an understanding of the theory and application of Econometrics to quantifying economic relationships and testing economic theories;
* Enable students to translate results from econometric analysis based on economic principles into useful and reliable policy reasoning;
* Equip students to read, evaluate and understand empirical papers in professional journals; and
* Provide students with practical experience of using econometric computer software to fit economic models.

1. **Expected Learning Outcomes**

By the end of the course students should:

* Have a solid understanding of the classical regression model, its underlying assumptions and the consequences of violating them;
* Understand how to specify an econometric model and conduct the necessary diagnostic and specification tests;
* Be able to conduct their own empirical investigations and critically evaluate econometric and other statistical evidence; and
* Understand econometric literature addressing economic issues in the region and be able to critically review their methodology and interpretation of results
* Understand the Discrete Analysis, Time Series Analysis and Panel Data Analysis with software application.

1. **Course Content**

**Topic 1: Introduction**

* 1. Introduction about Econometrics
  2. Linear Regression Models
     1. Ordinary Least Squares as
     2. Small Sample Properties of the OLS Estimator
     3. Goodness-of-fit
     4. Hypothesis Testing
     5. Asymptotic Properties of the OLS Estimator
  3. Model Specification
     1. Selecting the Set of Regressors
     2. Mis-specifying the Functional Form

**Topic 2: Problems of Measurement, specification, estimation and their Solutions**

* 1. Multicollnerity
  2. Heteroskedasticity
  3. Autocorrelation
  4. Model Specification Errors
  5. Distributed lag models and Expectations

**Topic 3: Discrete Choice Model**

* 1. Dummy variables
  2. Binary Choice Models
  3. Multi-response Models
  4. Binary and multinomial choice models: Probit and Logit models
  5. Truncated variables: The Tobit model

**Topic 4: Simultaneous Equations Models**

* 1. Endogenous and exogenous variables
  2. The identification problem: Necessary and sufficient conditions for identification
  3. Estimation of simultaneous equations (two Stage Estimation Methods)
  4. Exogeneity and Causality
  5. Endogneity and Instrumental Variables
  6. Recursive models

**Topic 5: Time Series Analysis**

* 1. Some time series models: AR and MA
  2. Stationary versus non-stationary time series, spurious regression
  3. Testing for non-stationary time series: Unit root test (Dickey-Fuller test)
  4. The Box-Jenkins approach and ARMA, ARIMA and SARIMA
  5. Predicting with ARMA Models
  6. Autoregressive Conditional Heteroskedasticity
  7. Dynamic Models with Stationary Variables
  8. Models with Non-stationary Variables
  9. Vector Autoregressive Models
  10. Co-integration and error-correction models (Engle-Granger test)

**Topic 6: Analysis of Panel Data**

* 1. Introduction to Panel Data Modeling
  2. The Static Linear Model
  3. Dynamic Linear Models
  4. Panel Time Series
  5. Models with Limited Dependent Variables
  6. Incomplete Panels and Selection Bias

1. **Mode of Delivery**

The course aims to balance theory and hands-on experience while working with economic data. As such, the lectures will emphasize the practical uses of econometric theory, and students will have ample opportunity to put this to use in computer-based assignments, including a project paper. In addition, students will select articles of their choice from professional journals for critical review and presentation in class as a basis for discussion regarding application of econometrics in analysis of economic problems.

* **Lectures (Theory)**

There will be 4 lectures per week each lasting for 60 minutes. Students will be expected to undertake 3 hours of independent study for every 1 contact hour.

* **Practical Classes**

There will be 2 hour of practical class per week. Each practical class will be preceded by a computer tutorial where the relevant commands for performing that week’s exercise will be introduced. The course instructor will identify relevant data sets (cross-section and time-series) for use in the practical classes: the textbook by Greene contains data sets and examples (including computer codes). Each student will subject his/her data set to various econometric tests and write a report.

* **Computer Tutorials** (SPSS, STATA, EVIEWS, R)

As the course involves a considerable amount of computing, students will have to learn and use selected econometric software packages. Three econometric software packages that are highly recommended are SPSS, EVIEW, and STATA. The recommended packages are widely used and are window based thus reducing the amount of programming until the user acquires sufficient experience.

1. **Assessment Methods**

The assessment criteria and their respective weights will be as follows:

* Written Continuous Assessment Tests at least two tests 20%
* Written Practical Tests/Term Paper 30%
* Written Final Examination 50%

1. **Course Materials**

**Recommended Textbooks**

* Verbeek, M. (2008). **A Guide to Modern Econometrics** (3nd ed.). John Wiley and Sons Ltd.
* *Wooldridge ()* **Introductory Econometrics***; 2nd ed.*
* Damodar Gujarati, (2001), **Basic Econometrics**, Mc-Graw Hill, Tokyo
* Greene, William, H .(2000)**Econometric****Analysis**(Fourth Edition), Prentice Hall International.

**Further Readings**

* \_\_\_, 1996, “Education returns across Quantiles of the wage function; alternative explanations for returns to education in South Africa,” American Economics Review, 86, 335- 39.
* Aboagye A.Q and Kisan Gunjal. 2000. An Analysis of Short-Run Response of Export and Domestic Agriculture in Sub-Saharan Africa. Agricultural Economics 23 (1), 41-53.
* Ainsworth, Martha, and Juan Mñoz, 1986, The Côte d’Ivoìre living standards study, LSMS Working Paper 26, Washington, D.C. World Bank.
* Alderman, Harold. 1993. “International Price Transmittal: Analysis of Food Markets in Ghana.” Oxford Bulletin of Economics and Statistics 55: 43-64.
* Barrett C.B. 1999. The Effect of Real Exchange Rate Depreciation on Stochastic Producer Prices in Low-Income Agriculture. Agricultural Economics 9 20 (3), 215-230.
* Barrett, C.B. 1997. Liberalization and Food Price Distributions ARCH-M Evidence from Madagascar. Food Policy 22 (2), 155-173.

**Econ 532: Research Methods for Economists**

**Classification:** Common **Number of Credits: 2**

**Course Description**

This course explores the process of designing, implementing, disseminating and analyzing the results of economic data. This course is about processes of obtaining, analyzing, interpreting and reporting reliable data of the real world. It aims to encourage students to appreciate their responsibilities to society and the scientific community as researchers. Students need to be well versed in the ‘real life’ issues, which have to be decided in setting up and managing research projects and how research can be used in development work. Students need to be able to balance their academic requirements with the needs of projects and development participants. They need the skills and adaptability to work in interdisciplinary teams and to understand what is required for their specific discipline and the broader requirement. The course covers introduction to research, research process, measurement scale, sampling and data collection, data analysis and interpretation, conducting participatory research as well as the writing of research report and documentation.

1. **Course Objectives**

* To understand the fundamentals of research concepts
* To be familiar with different types of research design
* To become familiar with major research methods
* To gain knowledge of processing and analysis of data for inferences
* To impact the skill of preparing scientific proposal and writing scientific researches

1. **Expected Learning Outcomes**

At the end of the course, students will be expected to understand that every research project should ask and answer the following questions: What is the problem/issue? Why is it important? How am I proposing to examine it? Why is this approach appropriate? How is it grounded in the literature, and what does it add to the literature? What did I expect to find/learn- i.e., my hypotheses/expectations? What did I actually learn? Why is what I learned important i.e. what are the implications for further research or for policy? Specifically, the student will:

* Acquire an understanding of the role of effective research;
* Be able to explain systematically and illustrate essential components of the research process;
* Develop skills in a range of research tools (qualitative and quantitative)
* Have a thorough grounding in the scientific approach to research;
* Appreciate the advantages, limitations and complementarily of different research approaches and methods according to context, purpose of research and type of data required;
* Apply quantitative and qualitative data analysis techniques used to organize data into some meaningful form;
* Be exposed to important components of the process of research management; and
* Be able to undertake a postgraduate research project for their thesis.

1. **Course Content**

**Topic 1: Introduction**

* Research: types, criteria of good research, limitations & ethical issues in social research. Scientific Research Methods, Approach and Designs (The case study, The longitudinal study, The comparison, The longitudinal comparison, The experiment, Controlling for influence in social science research)

**Topic 2: Research Process**

* Steps, Problem discovery and formulation, research proposal, Research Modeling- Hypothesis: Types, Formulation of Hypothesis, Errors in hypothesis testing, Parametric and Nonparametric tests.

**Topic 3: Measurement in Research**

* Measurement & Scaling Techniques, Scale Properties, Criteria for good measurement; Likert’s Scale, Semantic Differential Scale, Thurstone-equal appearing interval scale, MDS – Multi Dimensional Scaling.

**Topic 4: Sampling & Data collection:**

* Principles of sampling design, Types of Sampling - Probability and Non-probability Sampling Techniques, Sample Size. Data collection: Source & Techniques. Goodness of Data: Reliability, Validity, Generalizability, Authenticity & Trustworthiness

**Topic 5: Data Analysis and Interpretation**

* **Analysis of Quantitative Data:** Factor analysis, Correlation, Regressions, analysis of Moderators and Moderators, t-test, ANOVA, MANOVA, Structural equation modeling and Meta analysis.
* **Analysis of Qualitative Data**: Interview Approach, grounded theory and Narrative analysis, observation method, case studies and ethnography, critical management research
* Principles of good report/thesis writing

**Topic 6: Special Topic: Conducting Participatory Research**

* The main ideas underlying RRA/PRA, PRA methods and techniques, Preparation for PRA, PRA Implementation, Participation in the Analysis Process, How much participation is appropriate, Issues in Participatory research

**Topics 7: Writing Research proposal, paper and Documentation**

* Research report writing, Steps in Report Writing- format of Research Report- documentation footnotes and Citation, references and plagiarism, Preparing a grant proposal and Some guidelines for disseminating results in different dissemination media

1. **Mode of Delivery**

* Lectures/study guide, Seminars, group discussion, proposal preparation and if possible filed trip

**Practical in data management, data analysis and reporting**

* Processing the data, Describing data distributions, Measuring Relationships between variables, Reporting the information – tabular and graphic, Reporting the information – power point presentations

**Seminars by visiting professionals (suggested topics)**

* Review of national statistical sources – agricultural surveys, CSA surveys, Ongoing Local or regional research project with particular focus on data collections tools, limitations of data and managing the data gathering and processing

1. **Assessment Methods**

* Continuous assessments (20%): At least three written assignments and tests that cover the essential components of the research process
* Project/Term paper/Reviewing of journals/preparation of proposals – 30%
* Final Examination (50%) – which course the whole course content

1. **Course Materials**

**Recommended Textbooks**

* + Kothari, C.R. (1994) Research Methodology: Methods and Techniques, 2nd ed., Wishwa Prakashan, New Delhi.
  + Dasgupta, A.K (1968a). Methodology of Economic Research. N. Sinha Institute.
  + Alreck, P.L. and Settle R.B 2004. *The Survey Research Handbook.* Irwin Hill. Third Edition.
  + Sophie Laws. 2003 *Research for Rural Development: A Practical Guide*. Sage Publications.

**Further Readings**

* + Anandajayasekeran J. B. and Matata, K. et al Farming Systems Approach: A Handbook for East and Southern Africa
  + Babbies, E. 1989, The Practice of Social Research. Wadsworth Publishing Company
  + Bulmer M and D.P. Warwick Eds. Social Research in Developing Countries
  + Bulmer, M. 1982. The Use of Social Research: Social Investigation in Public Policy Making. London: George Allen and Unwin
  + Casley, D.J and Lury, D.A 1993. Data Collection in Developing Countries. Oxford University Press.
  + Chambers, Robert 1992, Principles Methods and Discoveries of PRA. In: Rural Appraisal: Rapid Relaxed and Participatory, Institute of Development Studies Discussion Paper No 311.

**Econ 581: Environment Economics & Natural Resource Management**

**Classification**: core  **Number of credits:** 4

**Course Objectives**

This course provides an intermediate analysis of Environment and Natural Resource Management as a basis for more advanced courses in special Environmental and Natural Resource Economics topics. The course provides students with an understanding of the different approaches to the management of environment and natural resource systems and the limitations of the different approaches. It looks at management options in terms of their ability to restore, mitigate or remediate impacts on ecological systems. The course examines environmental concerns on local to global scales and short to long time scales, using specific environmental problems and their management as examples. The objectives of the course are to:

􀁸 Introduce students to the basis of environmental management using some of the major issues, which threaten the environment today (global warming, water pollution etc.);

􀁸 Examine the main tools and techniques that have been developed to assess environmental problems and formulate appropriate strategies; and

􀁸 Consider the key economic, political and social factors that come together to affect the environmental decision-making process.

1. **Expected Learning Outcomes**

At the end of the course, the students will:

􀁸 Have a profound understanding of Environmental and Natural Resource Management and be able to construct good deductive arguments about causal relations;

􀁸 Demonstrate an understanding of the underlying science behind many of today’s environmental problems and an awareness of the measures needed for remediation;

􀁸 Be knowledgeable and able to apply the tools used by environmental managers; and

􀁸 Write concise and effective environmental policy briefing documents.

1. **Prerequisites**

The pre-requisites for this course should in principle be fully satisfied by the core courses of Macroeconomics, Microeconomics and Quantitative Methods at the masters’ level. Some grounding in the basic concepts of Ecology would be desirable.

1. **Course Description**

**Topic 1: An introduction to natural resource and environmental economics**

* Three themes
* The emergence of resource and environmental economics
* Fundamental issues in the economic approach to resource and environmental issue

**Topic 2:** The origins of the sustainability problem

* Economy-environment interdependence
* The drivers of environmental impact
* Poverty and inequality
* Limits to growth?
* The pursuit of sustainable development

**Topic 3:** Ethics, economics and the environment

Naturalist moral philosophies

* Libertarian moral philosophy
* Utilitarianism
* Criticisms of utilitarianism
* Intertemporal distribution

**Topic 4:** The efficient and optimal use of natural resources

* A simple optimal resource depletion model
* The economy and its production function
* Is the natural resource essential?
* What is the elasticity of substitution between *K* and *R*
* Resource substitutability and the consequences of increasing resource scarcity
* The social welfare function and an optimal allocation of natural resources
* Extending the model to incorporate extraction costs and renewable resources
* The optimal solution to the resource depletion model incorporating extraction costs
* Generalisation to renewable resources
* Complications
* A numerical application: oil extraction and global optimal consumption

**Topic 5:** The theory of optimal resource extraction: non-renewable resources

* A non-renewable resource two-period model
* A non-renewable resource multi-period model
* Non-renewable resource extraction in perfectly competitive markets
* Resource extraction in a monopolistic market
* A comparison of competitive and monopolistic extraction programmes
* Extensions of the multi-period model of non-renewable resource depletion
* The introduction of taxation/subsidies
* The resource depletion model: some extensions and further issues
* Do resource prices actually follow the Hotelling rule?
* Natural resource scarcityarcity

**Topic 6: Economic Theory of Allocating Stock and Flow Resources**

* Normative criteria for decision making, static efficiency, dynamic efficiency and sustainability
* Allocation of renewable and depletable resources
* Fishery
* Forestry
* Water
* Wild Life and Range lands

**Topic 7: Agriculture, Environment and Ecosystem Management**

* Agriculture and the environment
* Agriculture and agro-ecosystems
* Agricultural sector growth: national; regional; and global
* The role of intensification in agricultural growth
* The importance of agriculture and sustainability in economic development

Productivity and sustainability within agro-ecosystems

**Topic 8: Habitat Management and Habitat Restoration**

* The concept of habitat and the role of habits in ecology
* Habitat management for wildlife; important concepts in the management of introduced species.
* Restoration of farmland, industrial waste sites, forests, degraded water systems [e.g., water hyacinth infested lakes] and wild lands
* Management of restored areas.

**Topic 9: Biodiversity and Ecosystem Function**

* Worldwide biodiversity loss
* The theo-, anthropo- and bio-centric value arguments for biodiversity conservation
* Empirical evidence for biodiversity-function relationships and values of ecosystem services.
* Identification of keystone species
* Economic tools in reducing biodiversity loss
* Implications of forest gains in developing countries.
* Practical work: measurement of biodiversity

**Topic 10: Land Use, Land Markets, Land Policy and Soil Erosion**

* Land use and land value
* Land tenure and markets
* The concept of economic rent—homogeneous land; heterogeneous land
* The role of market structure and property rights in determining land rent
* Location and land value
* Efficient land use with competing uses
* Transportation costs and land rent
* Capital gains
* Land use policy
* Land use policy tools: Land law, the police power and taxation
* Some modern innovative suggestions for land use policy [seminar]
* Soil erosion and ecosystem management
* Sustainable soil management
* Soil erosion (forest / grassland conversion to arable)
* Soil management for improved soil structure
* Reduced erosion and soil nutrients
* Restoration of soil ecosystems.

1. **Mode of Delivery**

The course will be conducted in a series of in-class instruction sessions, practicals and in depth case study analysis in groups in support of analytical and quantitative skills for applying environmental and resource management techniques. The course is allocated 45 hours. These are divided as follows:

􀁸 *Contact hours*: Formal instruction (30), practical/laboratory sessions (9), case studies (3) and term paper (3).

􀁸 *Examination*: 3 hours

1. **Assessment Method**

Evaluation will be based on three elements: final examination, written assignments and an environmental and natural resource management issues paper/term paper.

**Written Assignments:** Students will be provided with weekly assignments that they will work on independently and in groups and submit for grading.

**Environmental Management Issues Paper***:* This is a longer, more research-orientated paper (i.e. the paper should reflect a student’s own original thinking about the issue from an environmental management perspective). The goal of this paper is to have student’s study in depth an environmental and natural resource management problem. Students will summarize all of the issues that motivate the problem, and then propose a solution (or solutions) to the problem, based on something that has been learnt in this course. For example, in controlling pollution of a large African city, a student might recommend that a transferable emissions permits program or a combination tax/subsidy program be established. The student would then briefly describe how the control program would actually work. The due date for this paper is ideally the final week of class and its length should not exceed 15 double spaced pages.

**Examination**: There will be a final supervised examination consisting of questions drawn from

lectures and readings of the course.

The weighting of each component in the final mark is as follows:

􀁸 Written Assignments 20%

􀁸 Term Paper/Project 30%

􀁸 Final Examination 50%

1. **Course Materials**

**Recommended Textbooks**

- Perman, Roger, Yue Ma, James McGilvray, Michael Common (2003). *Natural Resouces and Environmental Economics.* 3rd ed. Harlow, UK: Pearson Education

- Pearce and Turner 1990: *Economics of Natural Resources and the Environment*.

- Tietenberg, T 1992: Environmental and Natural Resource Economics.

**Further Readings**

- Barrow C.J. (1999), *Environmental Management: Principles and Practice*, Routledge.

- Bolund, P. and Hunhammar, S. (1999) Ecosystem Services in Urban Areas. *Ecological Economics* 29 (2): 293 –301 Brimblecombe, P. and Maynard, R.L. (2001), *The Urban Atmosphere and its Effects*, Imperial College, London.

- Canter, L.W. (1986). Environmental Impacts of Environmental Production Activities. Lewis Publishers, Michigan.

- Carlson, G., Zilberman, D. and Miranowski, J. (1993) *Agricultural and Resource Economics.* New York: Oxford University Press

- Foley G. (1992), *The Energy Question*, Penguin

**Econ 582: Environmental Valuation and Policy**

**Classification:** Core **Number of** **Credits:** 3

1. **Course Objectives**

This course primarily provides an in-depth analysis of environmental valuation and its use in informing environment and natural resources management policy. The course begins with the theory of markets, institutional and policy failures. It then proceeds with presentations on the welfare economics basis for natural resource and environmental valuation, market and non-market methods for environmental and natural resource valuation, project level environmental analysis and concludes with a presentation on the policy instruments for environmental and natural resources management. The course is designed so as to provide students with a blend of theory, methods, computer applications and case studies.

The course will expose students to the:

􀁸 Economic theory of markets, institutional and policy failures;

􀁸 Welfare economics foundations and environmental problems;

􀁸 Market and non-market techniques for the valuation of natural and environmental resources;

􀁸 Environmental cost benefit analysis;

􀁸 Policy instruments for environmental and natural resources management.

􀁸 Application of the principles of environmental valuation and policy to environmental problems in agriculture including land use conversion and change; external inputs [fertilizers, pesticides, herbicides etc]; introduced species [e.g., biotechnology]; water pricing [e.g., irrigation] and simplification of agro-ecosystems among others.

1. **Expected Learning Outcomes**

At the end of the course, students will have an enhanced understanding of the interpretation of environmental and natural resource management problems in the context of economic theory and on designing solutions to the same, based on a sound understanding of economics. Students will also have an enhanced understanding of applied environmental policy literature as well as gaining a solid background on doing independent applied research in the area of Environment and Natural Resource Management Policy. In addition to the in-depth theoretical knowledge gained, students will develop basic computational skills such as retrieving and preparing data and using relevant software for analysis.

1. **Prerequisites**

The course assumes students have familiarity at masters’ level of Mathematics for Economists, Microeconomics, Macroeconomics, Econometrics and Computer skills. Since the course has a strong micro component, a deeper understanding of the following topics in Microeconomics is particularly desired: theory of the consumer and the firm, welfare economics, general equilibrium theory and constrained optimization of a function of more than one variable. A good understanding of Econometrics will be desirable.

1. **Course Description**

**Topic 1: Markets, Institutional and Policy Failures**

* Externalities: Positive and negative externalities; Private and social costs; Pigouvian taxes; Lindahl equilibrium
* Public goods: the concepts of non-excludability and non-rivalry; Pareto optimal provision [Samuelson Rule]; The free rider problem
* Applications of the theory of public goods and externalities to agriculture: externalities associated with external inputs to agriculture [pesticides, fungicides, fertilizers]; biological invasions [the problem of introduced species in agriculture]; simplification of agro-ecological systems.

**Topic 2: The Welfare Economics Basis for Environmental Valuation**

* Compensating Variation [CV] and Equivalent Variation [EV]
* Consumer Surplus[CS] and Producer Surplus [PS] The instructor is expected to work out some algebraic examples of the welfare measures in class, subsequent to which students should be given some gradeable carry home exercises. This will give students an appreciation of what it means to estimate benefits using these measures before doing the same on computers

**Topic 3: Environmental Valuation and Analysis**

* The concept of total economic value
* Use and non-use value
* Direct and indirect value
* Option, existence and bequest value
* Methods for the valuation of environment and natural resources In presenting the valuation methods, the instructor should present the theoretical model; the theoretical issues in benefit estimation; empirical benefit estimation using the computer; reading and case studies. Benefits can econometrically be estimated using a number of software including LIMDEP and STATA. The benefit estimation exercises that students do on the computers should be handed in for grading.
* Direct methods [stated preference] of environmental valuation
* The contingent valuation method
* Indirect methods [demand curve based or revealed preference] of environmental valuation
* Travel cost
* Hedonic pricing
* Household production function approach
* Defensive expenditures
* Cost of illness approach
* Replacement cost
* Choice modeling
* Project level environmental analysis
* The discounting problem and the rationale of discounting
* The utility discount rate and the consumption discount rate
* Relationship between utility and consumption discount rate
* The consequences of discounting for environment and natural resources management policy.
* Environmentally adjusted CBA
* Environmentally compensating projects
* The treatment of irreversibility and risk in CBA

**Topic 4: Environmental Policy Targets and Instruments**

* Environmental policy targets
* Introduction to environmental policy
* Taxonomy of pollutants
* The efficient allocation of pollution
* Introduction to command and control instruments [CACs] and economic instruments [EIs] for environment and natural resources management [ENRM]
* The case for public intervention in pollution management
* Efficiency without optimality
* The cost effectiveness theorem
* Optimality and policy instruments
* Baseline conditions for CACs and EIs
* Command and control instruments (CACs) for environment and natural resource management
* Direct provision of public goods
* Regulation of technology
* Regulation of performance
* Price-based instruments for environment and natural resource management
* Pigouvian taxes
* Taxes, charges and earmarking
* Taxes on inputs and outputs
* Subsidies and subsidy removal
* Two-part tariff systems: deposit-refund systems, refunded emission payments
* Property rights-based instruments for environment and natural resource management
* Tradable emission permits
* Common property management
* Legal-/information-based instruments for environment and natural resource management
* Liability and other policy instruments
* Voluntary agreements
* Provision of information
* Selection of policy instruments
* Heterogeneity in abatement and equal taxes
* Heterogeneity in damage and differentiated taxes
* Prices Vs Quantities

In addition to the lectures under this topic, students should be given some case studies from Africa on the use and application of economic instruments to environment and natural resource management problems. The instructor should provide the students with some questions to guide them in deciding whether the appropriate instrument was used in the case study. It would be preferable to have the students work in groups [discussions are very important] and present their papers in class. The presentations and papers should be graded.

**Topic 5: The Politics and Psychology of Policy Instruments**

**Topic 6: Economy Wide Modeling**

* Introduction
* Input-output analysis
* Environmental input-output analysis
* Costs and prices
* Computable general equilibrium models

**Topic 7: International Environmental Problems**

* Introduction
* Game theory analysis
* International environmental agreements
* Other factors conducive to international environmental cooperation
* Stratospheric ozone depletion
* Global climate change

1. **Mode of Delivery**

The course will be divided into a set of lectures, tutorials and assignments. There will be weekly homework assignments to be executed on a networked computer. No previous knowledge of any of the computer packages that will be used is required for this course. The lectures and tutorials will serve as the necessary background for students to carry out homework on their own. The course is allocated 45 hours including the final written examination. These are divided as follows:

􀁸 *Contact hours*: Formal instruction (40), practical/laboratory sessions (5).

􀁸 *Examination*: 3 hours

1. **Assessment Methods**

Grading will be based on three elements: final examination, written assignments and an environmental economics issue paper.

**Homework Assignments***:* Students will be provided with assignments each week, reflecting some of the material they will be tested on in the exams. Questions will primarily be in short-answer, problem-solving formats.

**Environmental Issue Paper***:* This is a longer, more research-orientated paper (i.e. the paper should reflect the students’ original thinking about an issue from an environmental economic perspective, 10-15 typed pages, double-spaced). The goal of this paper is to have students study in depth an environmental problem. Students will summarize all of the issues that motivate the problem, and then propose a solution (or solutions) to the problem, based on something that they have learned about in this class. The issue paper needs to focus on natural resource and environmental valuation issues, such as national parks, siltation of dams and lakes, willingness to pay to avoid cities from pollution, willingness to pay for the environmental services of catchment forest reserves. The due date for this paper is ideally the final week of class.

**Examination:** There will be a 3-hour final examination consisting of sections A and B. Section A will be short-answer problems primarily patterned after your homework assignments and covering the entire syllabus. Section B will consist of more in-depth questions that put to test the students’ comprehension and analytical skills. Questions will be drawn from the lectures and readings.

􀁸 Homework assignments 20%

􀁸 Term Project 30%

􀁸 Final Examination 50%

1. **Course Materials**

**Recommended Textbooks**

- Perman, Roger, Yue Ma, James McGilvray, Michael Common (2003). *Natural Resouces and Environmental Economics.* 3rd ed. Harlow, UK: Pearson Education

- Sterner, T. 2003: *Policy Instruments for Environmental and Natural Resource Management*, Resources for the Future, the World Bank and Sida, Washington DC

**Further Readings**

- Adamowicz, W., J. Louviere and M. Williams, 1994. Combining Revealed and Stated Preference Methods for Valuing Environmental Amenities. *Journal of Environmental* *Economics and Management* 26: 271-292.

- Ahmed, Y. J. and G. K. Sammy 1987, Guidelines to Environmental Impact Assessment in Developing Countries *UNEP Regional Overseas Reports and Studies No. 85*

- Balance, A., J. Turpie, and P. Ryan. 2000: The Recreational Demand for Clean Beaches and Economic Impacts of Pollution: A Case Study from the Cape Peninsula, SA, EDE 2nd International Conference, Stockholm

- Barbier, E.B., A. Markandya and D.W. Pearce 1990: Environmental Sustainability and Cost-Benefit Analysis. *Environment and Planning* 22: 1269-1266.

- Barton, D. 2002: The Transferability of Benefit Transfer: Contingent Valuation of Water Quality Improvements in Costa Rica, *Ecological Economics* 42

**Econ 583: Climate Change Economics and Policy**

**Classification: Core Credit Hrs 3**

1. **Course Objectives:**

Societies today are paying most attention to the impacts of extreme meteorological events such as droughts, floods, fires and global warming, giving little attention to climate economics, although there are many important economic issues that need to be addressed. The aims of the course are to acquaint students in various disciplines with the theoretical background to understand the basic principles of economic and aspects of climate change. Specific objectives of the course include;

* Analyzing the interactions between economic activity and climate system
* Providing highlight of Alternative energy sources and limitations
* Assessing climate change mitigation potential costs at the national and international level

1. **Learning Outcomes**:

Students will be able to understand the linkage of climate change and human welfare and able to know the qualitative and quantitative techniques to determine the costs of mitigation options and the policy context.

1. **Prerequisite: None**
2. **Course Description:**

Climate change issues and climate policy have received increasing attention over the last decades. This course examines the role of economics in the formation of climate policy. Starting with an introduction into the basics of climate change, we will discuss basic concepts of environmental economics like efficiency, externalities, and environmental policy instruments. In applying those to the climate change problem, we will face questions on intertemporal decisions (should we act now or later), have to deal with uncertainties about impacts of climate change and costs of mitigation and adaptation, and with problems of international cooperation. The general economic principles will be applied in discussing selected applications like impacts of climate change on agriculture, the role of energy use, and in analyzing prominent climate policy approaches at the national and international level. Discussions of current policy initiatives and newspaper reports will complement the course.

**COURSE OUTLINE**

**Unit I – Introduction**

Science of climate change – global and regional climate predictions – uncertainty in science – physical impacts of climate change: agriculture, sea level rise, health, extreme events – policy debate.

**Unit II – Climate Change Policy - Mitigation**

Efficiency, public goods, externalities – environmental policy instruments: emissions trading, carbontax, emission trading versus tax; stock pollutants and discounting – decisions under risk and uncertainty.

**Unit III – Climate Change Policy - Adaptation**

Climate change impact assessment: applications for agriculture, sea level rise and health – vulnerability assessment – economics of adaptation – measurement of adaptation cost – issues in financing adaptation – case studies.

**Unit IV – Integrated Assessment**

Costs and benefits of greenhouse gas mitigation – integrated assessment models – simulation exercisesbased on DICE model and its variants – sensitivity and uncertainty analysis – Stern review.

**Unit V – Climate Change Negotiations and Equity**

Criteria for distribution of emission reduction burden – distribution criteria for adaptation fund – inter and intra-generational equity issues – discounting in climate change context.

**Unit VI – National and International Approaches to Climate Policy**

* **The international approaches to climate change policy**
* Different countries climate policy
* The various international climate change agreements or global environmental accords (e.g. the Kyoto protocol, UNFCCC)
* Who is polluter at international level
* Are there legal remedies at international level?
* The international legal framework on climate change
* Possible climate policy instruments (regulatory standards, cap-and-trade, taxes, voluntary agreements, information obligations) and the debate as to the effectiveness, efficiency, political feasibility of each instrument and comparative discussion of the climate policies and laws of major countries of the world.
* **The national approaches to climate change policy**
* The strength and weakness of the policy

1. **Modes of Delivery:**

Practical Exercises: Practical: Simulation software programs to analyze the collected relevant data. The course will be delivered through lectures, practical exercises, individual and group assignments.

Lectures: 32 periods

Practical: 20 periods

Case study: 24 hours

Presentation: 2 periods

Written examination: 2 periods

Total: 80 periods (3 cr. hrs)

1. **Modes of Assessment**

* Written exam which covered all portions. Exam questions could be essay type, workout, multiple choices and others depending on the teaching approach and materials provided to students (50%)
* Case study assignment at individual and group case (25%)
* Practical software program exercise at individual case (15%)
* Presentation of group case study assignments (10%)

**Readings**

Apart from the following textbooks, the course will draw on seminal and recent journal articles.

* Intergovernmental Panel on Climate Change (2007) – Fourth Assessment Report
* Stern, N. (2007). The Economics of Climate Change – The Stern Review, CambridgeUniversity Press.
* Nordhaus, W.D. (1994). Managing the Global Commons: The Economics of ClimateChange, MIT Press.
* Nordhaus, W. and J. Boyer (2003). Warming the World: Economic Models of Global Warming, MIT Press.
* Nordhaus, W. (2008), A Question of Balance: Weighing the Options on GlobalWarming Policies, Yale University Press, New Haven.
* Toman, M.A., U. Chakravorty, and S. Gupta (2003). India and Global ClimateChange: Perspectives on Economics and Policy from a Developing Country, RFF Press.
* Hanley, N. and A. D. Owen. 2007. The Economics of Climate Change, Routledge
* Michael Common and Sigrid Stagl. 2005. Ecological Economics: An Introduction, Cambridge University Press
* Herman E. Daly and Joshua Farley, 2004. Ecological Economics: Principles and Application, Island Press, Washington DC
* Anderson, D., 2007. “The Stern Review and the Costs of Climate Mitigation”, in World Economics 8(1): 211-219.
* Arnell, N, R. Warren, and R. Nicholls, 2007. “Response to a dual critique”, in World Economics 8(1): 229-231.
* Azar C. and K. Schneider, 2002, Are the economic costs of stabilizing the atmosphere prohibitive? Ecological Economics 42, 73-80
* Barker, t and others, 2007. “Climate Change 2007: Mitigation of Climate Change”, Summary for Policy Makers, IPCC Working Group III, IPCC Fourth Assessment Report, Intergovernmental Panel on Climate Change.
* Yamin, f. and J. Depledge. 2004. The International Climate change Regime. A Guide to Rules, Institutions and Procedures. Cambridge University Press
* Baker, T (2008) “The economics of avoiding dangerous climate change”, Climate Change 89 (3-4): 173-194
* Beinhocker, E. 2007. Origins of Wealth: Evolution, Complexity and the Radical Remaking of Economics, Random House business Books
* Barker, T., Scrieciu, S.S. and d. Taylor. 2008. “Climate change, social justice and development”, Development special issue 51(3): 317-324

**Econ 541: Institutional Economics**

**Classification:** Common **Number of Credits: 3**

**Course Objectives**

The general purpose of the course is to enable students understand how institutions are emerged and interaction among economic agents affected by them. The specific objectives are as follows:

* To equip the students with basic concept of institution and various theories in dealing with economic problems related to natural resource and environment;
* To assist the students to apply economics tools for analysis of institutions; and
* To provide a framework for enabling the students to see broader perspectives apart from Neoclassical economics concerning deriving force for actions of economic agents and means of maximizing their incentives.

1. **Expected Learning Outcomes**

At the end of the course, the student will be able to:

* Explain basic concepts of institutions and institutional economics and compare and contrast the Neoclassical Economics and New Institutional Economics
* Compare the different theories of institutional change with specific reference to their origin , focus and applicability;
* Explain alternative frameworks of institutional and be familiar with the use of game theory as a tool in institutional analysis;
* Clarify the theories of property rights and how property rights influence economic activities ; and
* Discuss transaction costs and link between transaction cost and contract

1. **Course content**

**Topic 1: Basic Concepts of Institutions and Institutional Economics**

1.1. Basic concepts: definition, classification, functions of institutions

* 1. .The need for non-market institutions
  2. .Institutionalism ancient, old, and new

1.4 .Understanding the relationship between institutions and economic development

**Topic 2: Informal Norms and Formal Laws**

* 1. Social Capital and Collective Action, Theories and Practices

-The Concept of Social Capital

-Theories of Collective Actions

-The role Social Capital in Collective actions (case examples)

-Other Determinants of Collective Action (case example)

* 1. The rule of law, legal traditions, and economic growth
  2. Property, politics, and development trajectories
  3. Property rights and institutional change
  4. The interrelationship between legal and economic processes

**Topic 3: Transaction Cost Economics**

3.1. Neoclassical economics Vs Transaction cost Economics

3.2. What transaction costs are and reasons for their existence(opportunism. Moral hazard, information asymmetry and Principal agent theory)

3.3. Classification of Transaction Costs

3.4. Determinants of Transaction Costs

3.5. Measuring Transaction Costs

3.6. Transaction costs and Contracts

-Contract as Absolute Property Right

-Bounded Rationality and Contractual Incompleteness

-The Role of Contracts in Minimizing Transaction Costs (an Example)

**Topic 4: Evolution of Particular Institutions**

* 1. Efficient and inefficient institutions
  2. Institutions and Political Economy
  3. Modern bureaucracy
  4. The Performance and Stability of Federalism: An Institutional Perspective
  5. Corporate governance, innovative enterprise, and economic development

**Topic 5: “New” Institutional Economics**

* 1. The problem of social cost and externalities
  2. Transaction cost analysis
  3. Theory of property rights
  4. Theory of Contracts

**Topic 6: Markets, Firms and State**

* 1. Market as organization
  2. Market organization as a result of market cooperation
  3. Incentive and limits to integrate
  4. Institutional models in the tradition of the neoclassical theory of the State
  5. Role of political institutions

**Unit 7: Institutional Change**

* 1. Nature of Institutional change (spontaneous Vs non spontaneous emergence)
  2. Theories of Institutional Change (The efficiency theory, Distributive bargaining theory and Political-economy theory)
  3. Regulation in a dynamic setting
  4. Regulating natural resources
  5. The politics of institutional change in a representative democracy
  6. State failure in weak states
  7. Rational individuals versus social dilemmas

**Topic 8: Institutional Performance and Economic Development**

* 1. Institutional Explanations of Underdevelopment
  2. Institution that Support Development
  3. Institution and Economics on Foreign Aid

**Unit 9: Some Country Experiences**

* 1. State formation and the construction of institutions for the first industrial nation
  2. Development strategies and institutions in Taiwan and China
  3. Institutional innovation in Brazil
  4. Developmental nationalism and economic performance in Africa

1. **Modes of Delivery**

Being a graduate course, delivery will combine both lectures and seminars. Students will be required to select topics for which they present and write terms papers as well as having regular lectures on each topic. The specific teaching aids required are overhead projectors and white boards for presentation of material. The course shall carry a total of 3 credit hours. Each week students will devote a minimum of 3 contact hours to this course. In addition, the students shall also do some independent work, which will be 9 hours of work.

1. **Assessment Methods**

This will be through assignments & mid-term test (20%), term paper (30%) and final examination (50%).

1. **Course Materials**
2. **References**

Chang, Ha-Joon (ed.) (2007). *Institutional Change and Economic Development*, United Nations University Press.

Eggertson Thr. (1990) .Institutions and Economic Behavior. Cambridge, Cambridge University Press.

Furubotn E., Richter R.( 1997) Institutions and Economic Theory. Ann Arbor. The University of Vichigan Press.

Hariss, J., Hunter, J. and Lewis, C.M. (eds.) (1995). *The New Institutional Economic and Third World Development*, Routledge.

Нart O. Firms(1995) Contracts and Financial Structure. Oxford,Clarendon Press Ménard, Claude and Shirley, Mary M. (eds.) (2008). *Handbook of New Institutional economics*, Springer.

Milgrom P., Roberts J.( 1992) Economics, Organization and Management. – Prentice-Hall Int.

North, D. (1990). *Institutions, Institutional Change and Economic Performance*, Cambridge University Press.

Odintsova(2008) M.I. Institutional economics. Textbook. Moscow, SU-HSE

Rutherford, Malcolm (1994). *Institutions in economics: The old and the new institutionalism*, Cambridge University Press.

Williamson O. (1985) The Economic Institutions of Capitalism. The Free Press, N.Y.

Williamson, O.(2008 )Transaction Cost Economics.In:C.Menrad and M.M. Shirley(eds) Handbook of New Institutional Economics, Springer Verlag:Berln

**Further Readings Material**

* Bardhan,Pranab(1989).The Institutional Economics and Development Theory:A Brief Critical Assessment.World Development17(9),1389-1395.
* Eggersson,Thrainn(1997).The Old Theory of Economic Policy and the New Institutionalism. *World Development 25(8),* 1187-1203
* Knight, Jack(1992).*Institutions and Social Conflict.* Cambridge: Cambridge University Press
* Schmid,A.(2004).Conflict and Cooperation: Institutional and Behavioral Economics. Blackwell Publishing
* Smith H.E.(2002).Exclusion Vs Governance:Two Strategies of Delineating Property Rights, Journal of Legal Studies, vol 31
* Scott,A.(2008).The Evolution of Property Rights. Oxford University Press.
* Ostrom, Elinor(1990).*Governing the Commons:The Evolution of Institutions for Collective Action.Cambridge: Cambridge University Press.*
* Aggrawal, A.(2001) Common Property Institutions and Sustainable Governance of Resources.World Deveopment, 29(10) 1649-1672.
* Bolton,G.E, and Ockenfels,A.(2000). A theory of equity, reciprocity, and Competition.*American Economic Review* 90,166-93.
* McCann, L.,Colby, B.,Easter,K.W.,Kastrine, A.,Kuperan, K.V.(2005).Transaction Cost Measurement of Environmental Policies. Ecological Economics 52:527-542
* Shirley, M.M. (2008).Institutions and Development, Edwards Edgar, Cheltenham, UK,NorthamptonmMA,USA
* Norht, Douglas(1989).Institution and Economic Growth: A Historical Introduction, *World Development* 17(9),1319-1332.

**Econ 651: Economics of Agriculture and Rural Development**

**Classification: Elective Credit Hour: 3**

**Course Description**

Most of the world’s poor still live in rural areas and whilst poverty in the world’s growing cities is a major problem, a large proportion of the urban poor are migrants from rural areas. This course is about progress and change in the rural areas of developing countries. It is concerned with the factors driving rural change, how we define progress, and what can be done to bring about the overriding objective of rural development, which is to reduce, and eventually eliminate poverty. This course examines the importance of agriculture and its general role for economic development in developing countries. In addition, it also examines the concepts, theories and strategies of rural development.

It examines the role of rural finance, rural infrastructure, cooperatives, agricultural research and extension, climate change adaptation and mitigation mechanisms for agricultural and rural development.

1. **Objectives and learning outcomes of the course**

On completing this course, students will be able to:

* Recognize and explain key concepts, ideas and debates in rural development and outline the main opportunities and constraints relating to the development of rural economies and the reduction of rural poverty
* critically evaluate the contribution of different sectors, policies, services, and actors to the process of rural development
* outline and discuss current debates regarding the roles of markets, the state, institutions, property rights, agriculture and the rural non-farm economy critically evaluate past and existing attempts to supply rural services, such as infrastructure, finance, research and extension
* analyze alternative policy options in terms of their potential impact on rural poverty

1. **Course Content**

**Topic I: Introduction**

Meaning and basic concepts of agriculture and rural development, trends in agricultural growth, regional variations in growth of output and productivity, Impact of globalization on agriculture Diversification of Rural Economic Activities: Livestock economies - Livestock resources and their productivity; White revolution; Fishery and poultry development; Forestry, Horticulture and floriculture; Issues and problems in rural industrialization and development of agro-based industries, rural non-farm sector economy (RNFE), Inter sectoral relationships, maximization of the beneficial effects on rural income and employment levels)

**Topic II: Agricultural Development**

Distinctive features of the agricultural sector in developing countries, the role of agriculture in economic development, strategies for agricultural development, the role of technological innovation and population growth, food security, resource scarcity and population challenges, Farm size and productivity, Agricultural marketing, Models of agrarian household behavior, land property rights and policy and Women Empowerment in Agriculture

**Topic III: Rural infrastructure**

The importance of Roads and transport to access markets and essential services, performance of infrastructural sector in rural areas, the role of infrastructure for rural development, communication infrastructure

**Topic IV: Rural finance**

The role of finance in rural development and the challenges involved in providing sustainable financial services to the rural poor, types of financial services and the factors influencing supply and demand in rural credit markets and the problems facing borrowers and lenders, and Rural credit policy

**Topic V** **Co-operatives:**

The concepts, basics, history of co-operatives as well as the operational patterns of co-operatives in developed and developing countries and the connections to the global co-operative organizations, The role of co-operatives in agricultural, rural and sustainable development and the way co-operatives respond to the question of poverty alleviation, The challenges and solutions from the point of view of the informal and formal types of co-operatives in the developing and developed countries, The key-issues connected to sustainable development and the challenges to co-operatives as regards community development, poverty alleviation and the process of peace - building in developing countries

**Topic VI: Climate Change and Sustainability – Mitigation and Adaptation**

Effects of Climate Change on developing country agriculture, Climate friendly landscape strategies, Environmental benefits from agriculture (agricultural landscape, biodiversity, and traditional species), The Economics of Ecosystems and Biodiversity, Characteristics of Traditional Agriculture and adaptive capacity

**Topic VII: Agricultural research and extension**

The role of agricultural research and extension in rural development, key characteristics, and the objectives, delivery, and financing of evolving research and extension approaches and systems, appropriate roles of public, private and other stakeholders in agricultural research and extension

**Topic VIII: Agriculture and Rural Development policy measures in Ethiopia and other developing countries**

1. **Modes of Delivery:**

The course will be delivered through lectures, Term Papers, individual and group assignments.

1. **Modes of Assessment**

* Written exam which covered all portions. Exam questions could be essay type, workout, multiple choices and others depending on the teaching approach and materials provided to students (50%)
* Case study assignment at individual and group Level (20%)
* Term Paper and Presentation (30%)
* Final Exam (50%)

1. **References/Textbooks**
2. Gail L.C, C.W. Jensen and Douglas D. 1997. Agricultural Economics and Agribusiness. 7th Edition
3. Harold G. Halcrow. 1984. Agricultural Policy Analysis.
4. Holmberg, J. 1992. Making Development Sustainable. International Institute for Environment and Development
5. Rao, P.K. 2000. Sustainable Development. Economics and Policy. Black well publishers Inc.
6. Reports on the Ethiopian Economy. Ethiopian Economic Association (Different Volumes)
7. Thirlwall, A. P. 2003. Growth and Development: With special Reference to Developing Countries, 7th Ed. Pal grave: McMillan.
8. Todaro, M.P. and S.C. Smith 2003. Economic Development, 8th Edition. Pearson: Addison Wesley.
9. Todaro, P.T. 1992. Economics for Development world: An Introduction to Principles, Problems and Policies for Development, Long man.
10. Workneh Negatu, Legese Dadi and Abebe Haile Gebriel (eds) 2003. Agricultural Policy in Ethiopia's Economic Development: Scope, Issues and Prospects. Proceedings of the 6th Annual Conference of the Agricultural Economics Society of Ethiopia, 30-31 August, 2002, Addis Ababa, Ethiopia.
11. Katar Singh (1999), Rural Development: Principles, Policies and Management, 2nd Ed. Saga Publications, New Delhi
12. Frank Ellis (1992) agricultural policies in developing countries, Cambridge University Press, Cambridge
13. Yujiro Hayami, (1997) Development economics: From poverty to wealth of nations, Clarendon Press, Oxford
14. Hendrik Van Den Berg (2001), Economic Growth and Development, McGraw – Hill Higher Education
15. Michael P.Todaro (2000), Economic Development, Addison-Wesley, Amsterdam.
16. Meier, Gerald (1995), Leading issues in Economic development, Sixth edition, Oxford Univeristy press Oxford - New York

**Additional readings**

All development books are your additional reference but the following books will be very use full in specific chapters

1. Gopal Lal Jain (1997), Rural Development, Mangal Deep Publications Jaipur India.
2. Tom Tietenberg (2003), Environmental and natural resource economics, 6th ed., Pearson Education Inc.
3. Joseph E. Stiglitz (2001) “information and change in paradigm in economics”, Nobel prize lecture, December 8, 2001
4. Addisalem Belema (2003), Economic development and democracy in Ethiopia, Dissertation in Erasmus University, Rotterdam
5. Todaro, Chaelp (2000), Economic Development, fifth edition, Pearson education Limited Edinburgh Gate, Harlow –England
6. Hayami, Yujiro (1997), Development Economics, Oxford University press, Oxford - New York

**Econ 661: Project Design and Analysis**

**Classification: Elective Credit Hours: 3**

1. **Course Objectives**

The aim of the course is to provide the students with tools necessary for the appraisal of investment projects. The course will also familiarize the students with case studies which demonstrate the use of these techniques in practice.

1. **Prerequisite: None**
2. **Course Description**

**Topic I: Introduction**

* Project choice and national planning
* Generation and Screening of Project Ideas
* **Technical Analysis of projects**

**Topic II: Cost Benefit Analysis (CBA)**

* 1. **Introduction**
* The rationale of cost-benefit analysis (CBA): Value judgments and CBA, Criticisms of ‘conventional CBA’, Identification of benefits and costs
* The welfare foundations of cost-benefit analysis: Social appraisal in a World of identical consumers, Cardinal Utility and cost-benefit analysis, The compensation principle, Utility possibility curves and the potential welfare criteria , The social welfare function
  1. **Private Benefit-Cost Analysis:**
* **Financial Analysis:** Estimation of cost of projects, estimates of sales and production – cost of production – working capital requirement and its financing – estimates of working results – breakeven points – projected cash flow statement – projected balance sheet.
* **Appraisal criteria**: Net Present Value – benefit cost ratio – internal rate of returns – urgency – payback period – accounting rate of returns – investment appraisal in practice.
* **Project Financing:** Norms and policies of financial institutions – project appraisal by financial institutions. Menu of Financing: equity capital – internal accruals – term loans – bonds – working capital advance – raising capital in international markets, Project contracts.
  1. **Social Cost Benefit Analysis (SCBA)**
* Efficiency Benefit-Cost Analysis
* Consumer and Producer Surplus in Benefit-Cost Analysis
* Valuing Traded and Non-traded Commodities in Benefit-Cost Analysis: Valuation of traded goods, Valuation of non-traded goods, Valuation of non-traded in variable supply, Valuation of non-traded in fixed supply, shadow pricing (Shadow pricing of foreign exchange, Shadow pricing of labor, Shadow pricing of capital)
* The Social Discount Rate, Cost of Public Funds, and the Value of Information
* Weighting Net Benefits to Account for Income Distribution
* Stated preference approaches to environmental valuation
* Revealed preference methods (1): the travel cost model
* Revealed preference methods (2): hedonic pricing
* Valuing the environment: production function approaches
* Economic Impact Analysis
  1. **Writing the Benefit-Cost Analysis Report**

**Topic III: Multiple Projects and Constraints**

* Constraints – methods of ranking – mathematical programming approach – linear programming model. Qualitative Analysis: qualitative factors in capital budgeting – strategic aspects – strategic planning and financial analysis – informational asymmetry and capital budgeting – organizational considerations. Environmental appraisal of projects: types and dimensions of a project – meaning and scope of environment – environmental resources values – environmental impact assessment.
* Choice between mutually exclusive projects of unequal life – optimal timing decision – determination of economic life – inter-relationships between investment and financing aspects – inflation and capital budgeting. Analysis of firm and market risk: portfolio theory and capital budgeting – capital asset pricing model (CAPM) – CAPM and Capital budgeting.

**Topic IV: Analysis of Risk**

Types and measure of risk – simple estimation of risk – sensitivity analysis – scenario analysis – simulation analysis – decision tree analysis – selection of project – risk analysis in practice.

**Topic V: Project Management**

Forms of project organization – project planning – project control – human aspects of project management – prerequisites for successful project implementation. Network techniques for project management: development of project network – time estimation – determination of critical path – scheduling when resources are limited – PERT and CPM models – Network cost system. Project review and administrative aspects: initial review – performance evaluation – abandonment analysis – administrative aspects of capital budgeting – evaluating the capital budgeting system of an organization.

1. **Modes of Delivery:**

The course will be delivered through lectures, Term Papers, individual and group assignments.

1. **Modes of Assessment**

* Written exam which covered all portions. Exam questions could be essay type, workout, multiple choices and others depending on the teaching approach and materials provided to students (50%)
* Case study assignment at individual and group Level (20%)
* Term Paper and Presentation (30%)

1. **References/Textbooks**

**Essential Reading**

* Chandra, Prasanna (2009). Projects: Planning, Analysis, Financing, Implementation and Review, 7th ed., Tata McGraw Hill.
* Larson, Erik W. and Clifford F. Gray, (2011). Project Management: The Managerial Process, 5th ed., McGraw Hill.

**Additional Reading**

* Boardman, A.E., et al. (2005). Cost-Benefit Analysis: Concepts and Practice, 3rd ed., Pearson Education.
* Cleland, David and Lewis Ireland (2006). Project Management: Strategic Design and Implementation, McGraw Hill.
* Cleland, David and Lewis Ireland (2007). Project Manager's Handbook: Applying Best Practices Across Global Industries, McGraw Hill.
* Esty, Benjamin (2003). Modern Project Finance: A Casebook, John Wiley & Sons.
* Ghattas, R.G. and Sandra L. McKee (2000). Practical Project Management, Pearson Education.
* UNIDO, Guidelines for practical project appraisal

**References**

1. Johansson, Per-Olov (2003). Cost-Benefit analysis of Environmental Change, Cambridge University Press.
2. Dasgupta, P., Sen, A., and M., Stephen. Guidelines for Project Evaluation; Project Formulation and Evaluation Series, No. 2. United Nations Industrial Development Organization, Vienna.
3. Little, I.M.D., and J. A., Mirrlees (1982). Project Appraisal and Planning for Developing Countries. Heinemann Educational Books London.
4. Layard, R., and S. Glaister (2003). Cost-Benefit Analysis, Cambridge University Press.
5. Pearce, D. W., and C. A., Nash (1981). The Social Appraisal of Projects: A text in Cost-Benefit Analysis, The MacMillan Ltd., London.
6. Fuguitt, D., and J., Wilcox (1999). Cost-Benefit Analysis for Public Sector Decision Makers, Quorum Books, Westport, Connecticut.
7. Hanley, N., and E. B.,Barbier (2009). Pricing Nature: Cost-Benefit Analysis and Environmental Policy, Edward Elgar, Cheltenham, UK, Northampton, MA, USA.
8. Mishan, E.J., and E. Quah (2007). Cost-Benefit Analysis.Rouledge Taylor & Francis Group London & New York.

**Econ 691: Seminar in Environmental and Natural resource Economics**

**Classification: Core Credit Hours: 1**

**Course Description and Modes of Delivery**

This course focuses on presentation of practical works related to the environment and natural resource. To this end, the students are expected to extract, examine and present the information on the emerging issues in the real world, through application of their theoretical knowledge. The course is associated with preparation and presentation of term papers and thesis proposals. Besides, the students may be expected to attend and present reports of various workshops, conferences and related events on the issues under consideration.

* 1. **Course objectives:**

The delivery of this course has the tendency to bridge the gap between the theoretical and the real aspects. This course is delivered to make the students to be familiar with the real aspects of the environment and natural resource in the real world. Specifically, the course is expected;

* To help students acquire practical skill of examining multi-dimensional aspects of the environment and natural resource in the real world
* To provide the students up-to-date information about current aspects of the environment and natural resource
* To improve the understandings of the students about findings of empirical works related to the environment and natural resource
* To provide the students the knowledge about the trends and emerging issues of the environment and natural resource in the real world
  1. **Pre-requisite: Econ 583**
  2. **Modes of Assessment**

The modes of assessment include:

* Participation on various events …………………………………………… 20%
* Preparation of term paper …………………………………………………… 50
* Presentation of Term papers (individual and group) ……………………… 30%

**Econ 692: Master Thesis**

* 1. **Description**

The master thesis comprises the preparation of proposal for the graduate thesis and the main research. Students identify and state briefly the problem and design methods of how the research could be done. Students prepare their thesis proposal based on the courses advanced econometrics application and research methods. The students will conduct their main research based on the approved proposal, submit their research findings and defend.

* 1. **Course Objectives**

At the end of the course students will be able to conduct problem solving researches that help the surrounding community and the nation at large and providing research finding that can be used as input for government policy makers, Reference of dialogues for different stakeholders, Reference for further inquiries in the area and so on.

* 1. **Assessment Method**

Students once they prepare the proposal the department organize presentation. The presentation must have at least two examiners from the department. The student’s proposal must be accepted by the examiners.

Up on the accomplishment of the students’ master’s thesis, their performances are evaluated based on the Dire Dawa senate legislation.