



**DARBARI SETH BLOCK, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI**

**SUB: SIXTEENTH MEETING OF THE ACADEMIC COUNCIL
AGENDA NOTES**

Date : 31 July 2007
Venue : Conference Room, TERI
Time : 10:30 am

Item No.	Particulars
Item No. 1	To confirm the minutes of the fifteenth meeting of the Academic Council held on 3 January 2007
Item No. 2	Matters for information
Item No. 3	To consider and approve initiation of a new PG Diploma programme "Regulations in Agricultural Biotechnology".
Item No. 4	To consider and approve courses in the PG Diploma "Regulations in Agricultural Biotechnology" programme.
Item No. 5	To consider and approve courses of the II semester of the MA (Public Policy & Sustainable Development) programme.
Item No. 6	To consider and approve courses of the III semester of the MBA (Infrastructure) programme.
Item No. 7	To consider and approve courses of the M.Sc programmes.
Item No. 8	Creation of a Department of Biotechnology
Item No. 9	Any other item with the permission of the Chair.

Item No. 1 To confirm the minutes of the fifteenth meeting of the Academic Council held on 3 January 2007

The minutes of the fifteenth meeting of the Academic Council held on 3rd January 2007 were circulated to the members. No comments have been received so far.

The Academic Council may, therefore, consider confirming the minutes, as circulated.

Item No. 2 Matters for information

- (i) 31 students of M.Sc (Environmental Studies) and M.Sc (Natural Resources Management) programmes have successfully completed the II semester of their studies.
- (ii) 14 students of the MBA (Infrastructure) programme have successfully completed the II semester of their studies. Nine of these, who are sponsored candidates, have now proceeded back to their respective organisations for their major projects. The other five are, at present, undergoing summer projects and will, thereafter, move into the III semester of their studies.
- (iii) 21 students of the MA (PP&SD) programme have successfully completed the first semester of their studies, and are, at present, undergoing the summer semester at US Universities.
- (iv) The following faculty members have joined the University on the dates mentioned below:

Mr M V Siju	February 26, 2007
Dr P K Joshi	February 27, 2007
Dr Mala Narang Reddy	May 28, 2007
Dr Ramakrishnan Sitaraman	June 25, 2007

- (v) Construction work for the university campus at Vasant Kunj is nearing completion. It is likely to be ready for occupation by November 2007.

Item No. 3 To consider and approve initiation of a new PG Diploma programme “Regulations in Agricultural Biotechnology”.

The University proposes to offer a PG diploma programme in “Regulations in Agricultural Biotechnology” from October 2007. This will, at present, be offered from the Department of Natural Resources and will be moved to the Department of Biotechnology once it is setup.

The programme outline and the other details are placed at Annexure 3.1.

The programme coordinator will present the proposal for the consideration of the Academic Council.

Item No. 4 To consider and approve courses in the PG Diploma “Regulations in Agricultural Biotechnology” programme.

The course outlines for ten courses to be offered in the PG Diploma programme are placed at Annexures 4.1 to 4.10.

The Academic Council is requested to consider and approve the course outlines.

Item No. 5 To consider and approve courses of the II semester of the MA (Public Policy & Sustainable Development) programme.

The course outlines for 11 courses which will be offered as electives in the II semester for the MA (PP&SD) programme are placed at Annexure 5.1 to 5.11.

The Academic Council is requested to consider and approve the course outlines.

Item No. 6 To consider and approve courses of the III semester of the MBA (Infrastructure) programme.

The course outlines for eight courses which will be offered in the III semester of the MBA (Infrastructure) programme are placed at Annexures 6.1 to 6.8.

The Academic Council is requested to consider and approve the course outlines.

Item No. 7 To consider and approve courses of the M.Sc programmes.

The course outlines for five courses to be offered in the M.Sc (Environmental Studies), (Natural Resources Management) and (Water Resources Management) programmes are placed at Annexure 7.1 to 7.5.

The Academic Council is requested to consider and approve the course outlines.

Item No. 8 Creation of a Department of Biotechnology

As envisaged in the concept paper of the University, a department is to be created when teaching and research are required to be initiated at the post graduation level. The creation of the Department of Biotechnology is envisaged in the Development Plan of the University. The Academic Council

is requested to consider and recommend the creation of this department. The Council is also requested to recommend creation of six faculty positions in this department.

Item No. 9 Any other item with the permission of the Chair.



**Advanced Post Graduate Diploma in Regulations in
Agricultural Biotechnology**

**Sponsored and Approved by:
Department of Biotechnology (Government of India)**

with

**Technical support from
USTDA (United States Trade and Development Agency)**

**TERI-University
New Delhi**

Advanced Post Graduate Diploma in Regulations in Agricultural Biotechnology

Program Outline

Biotechnology in the post-genomic era is radically changing the way we address issues related to agriculture, healthcare and environment. In order to sustain the current progressive trend, there is a need to promote research in both its fundamental and applied form. However, there are concerns relating to the impact of biotechnology on the overall safety of human health and environment since the modern science touches the territory of the unknown. Therefore, there is a need to maintain the delicate balance of safeguarding against potential adverse effects of Biotechnology without impeding the momentum of knowledge expansion. These seemingly dual objectives can only be reached through a balanced development of Biotechnology through integration of scientific knowledge with associated regulatory aspects.

While India has an existing regulatory framework for biosafety, there is paucity in skilled personnel well grounded in the scientific intricacies of the subject as well as the multidimensional regulatory aspects. Unfortunately, no educational program currently exists that aims at creating human resources in order to meet the existing gap in such a profound manner. This necessitates generation of requisite human resource capacities in various government and non-government sectors as well as amongst fresh graduates.

The proposed program “**Advanced Post Graduate Diploma in regulation in agricultural biotechnology**” has been formulated in order to generate a cadre of trained personnel, at two levels. First, through upgrading the skills of in-service personnel for immediate benefits, and second through creating freshly trained manpower that will provide long-term solutions.

Objectives of the course

Through this program, TERI University aims at contributing to a balanced biotechnological development through:

- Promotion of R&D in Agricultural biotechnology in consonance with the regulatory aspects;
- Providing support to policy makers and regulators in interpretation and implementation of existing policies and their suitable amendments in the fast changing international and national scenario;
- Guiding biotech research institutions and industry to comply with national regulations and international obligations, India being a Party to the CPB (Cartagena Protocol on Biosafety) and other Multi-lateral Agreements;
- Assisting industry in commercialization of biotech products through sound Intellectual Property Management;

Skill Set:

The candidates, at the end of nine months rigorous training, would become adept at:

- Interpretation and implementation of existing policies
- Biosafety risk assessment and management
- Analysis of the linkages between international agreements and protocol requirements
- Assessment of trade impacts of biosafety related measures
- Supporting in, case-by-case, cost benefit analysis, review of socioeconomic, ethical considerations and relevance of LMOs in addressing societal needs (food security and nutritional requirements)
- *Ex-ante* and *Ex-post* risk and cost-benefit analysis
- Supporting in Intellectual Property Management

Eligibility Criteria

Categories for admission:

- a) Master's degree in Life Sciences, Agriculture, Environmental Sciences, Food and Nutrition or related disciplines
- b) B. Tech in Biotechnology
- c) Masters degree in Social Sciences and Economics

d) Five years integrated B.A. (LLB) degree or equivalent

The candidates should have procured a minimum cumulative grade point average of 6.75 on a 10-point scale or equivalent, as determined by TERI University, wherever letter grades are awarded, or 60% marks in aggregate wherever marks are awarded. Candidates, from Social Sciences/Law background would be given a relaxation of 5%/0.75 Cumulative Grade Point Average.

Selection Procedure

Admissions to the Advanced Post Graduate Diploma Program will be on the basis of evaluation of the applications and the nominations received. The candidate may be interviewed wherever university deems necessary.

In-service candidates

The nominees from government and non-government sectors, agencies and industry are required to submit, at the time of the registration, a sponsorship certificate from their employer on an official letterhead, stating that for the period of his/her study at the university, the candidate will be treated as on duty with regular salary and allowances, and that he/she will be fully relieved for the period of study for pursuing his/her studies.

Program Outline

Following core-courses will be offered to the candidates over a period of 9 months. Introductory core course on fundamentals of Biotechnology with associated laboratory practical would be provided for 2 months in order to orient the candidates to the intricacies of the life sciences and to define the perspective before impinging upon the actual training on Regulations in Agricultural Biotechnology. Besides these, field visits to ICAR and IARI campuses will be organised to expose the candidates to the conduct of field trials. Visits will also be organized to NBPGR, to acquaint the candidates to the know how of deposition of GM seed and its certification. Discussions/Interactive sessions will be organized with scientists at IARI, ICAR and seed companies to sensitise the participants to the issues relating to sampling and evaluation of Agronomic Performance of GM crops. Additional hands on training will include introduction to Food Safety at

Shri Ram Centre of Industrial Research. Introduction will also be provided to Labelling and Handling of consignments, procedures of Customs Clearance and P2 Inspections.

Advanced Post Graduate Diploma in Regulations in Agricultural Biotechnology (40 Credits)

Part 1: Introduction to the Science of Life (10 Credits)					
Core course		Faculty	Credits	Credits (Theory: Practical)	
Molecular basis of life (PGDR-101)		TERI-University	3	2:1	
Principles of genetic engineering and bio-analytical techniques (PGDR-102)		TERI-University	4	2: 2	
Biotechnology in agriculture sector (PGDR-103)		TERI-University	3	2: 1	
Part 2: Regulations in Agricultural Biotechnology (30 Credits)					
Core course (PGDR-104): Intellectual Property Rights and Trade Related Issues					
Credits: 8			Hours: 112		
Lecture	Tutorial	Term Paper	Lecture	Tutorial	Term Paper
3 Prof. Kershen Drew, University of Oklahoma/ Guest faculty	2 TERI-University	3 TERI-University	42	28	42
Core course (PGDR-105): Principles of Regulation					
Credits: 3			Hours: 42		
Lecture	Tutorial	Term Paper	Lecture	Tutorial	Term Paper
1 (TERI-University/ Guest Faculty)	1 (TERI-University)	1 (TERI-University)	14	14	14
Core course (PGDR-106): Environmental Safety					
Credits: 6			Hours: 84		
Lecture	Tutorial	Term Paper	Lecture	Tutorial	Term Paper

2 (Dr. Karen Hoksanson, University of Minnesota)	2 (TERI-University)	2 (TERI-University)	28	28	28
Core course (PGDR-107): Food Safety					
Credits: 8			Hours: 112		
Lecture	Tutorial	Term Paper	Lecture	Tutorial	Term Paper
3 (Dr. Hector Quemeda, Calvin College, Michigan)	2 (TERI-University)	3 (TERI-University)	42	28	42
Core course (PGDR-108): Multilateral Agreements and India's Obligations					
Credits: 3			Hours: 42		
Lecture	Tutorial	Term Paper	Lecture	Tutorial	Term Paper
3 (TERI-University)	0	0	42	0	0
Core course (PGDR-109): Regulatory Systems in India					
Credits: 1			Hours: 14		
Lecture	Tutorial	Term Paper	Lecture	Tutorial	Term Paper
1 (TERI-University)	0	0	14	0	0
Core course (PGDR-110): Bioethics, Public Awareness and Communications					
Credits: 1			Hours: 14		
Lecture	Tutorial	Term Paper	Lecture	Tutorial	Term Paper
1 (TERI-University)	0	0	14	0	0

Course No.:	PGDR 101
Course title:	Molecular basis of life
Number of credits:	3
Credits (Lecture: Practical):	2:1
No. of hours:	28:28
Course coordinator:	Dr Ramakrishnan Sitaraman Dr Sanjay Saxena (Practical Training)

Course outline:

The present core course is formulated for the purpose of imparting fundamental knowledge that is central to the field of life sciences, to a body of students coming from diverse academic backgrounds. The topics covered would form the basis for some of the more advanced concepts relating to biotechnology and its applications. The topics covered would include introduction to a living cell (prokaryotic and eukaryotic) and its organelles with regard to the structure and function; the biochemistry of cell; and how it superimposes with cellular location and sites; DNA as the genetic material and its double helix structure and mode of replication; the central dogma of molecular biology defining the flow of genetic information; gene organization in eukaryotes and prokaryotes, control of gene expression at transcriptional and translational level. This core course shall orient the students to the molecular basis of life and would set the pace for introducing more advanced topics relating to biotechnology. In terms of practical training, the candidates would be introduced to a molecular biology laboratory, sensitized to the importance of conforming to safe laboratory practices and will learn how to extract plasmid and genomic DNA.

Evaluation procedure

Theory and Practical	: 1:1
Theory	
▪ Quizzes	: 20 %
▪ 2 minor tests	: 40% (20 % each)
▪ 1 major test (end semester)	: 40%
Practical	
▪ Practical Exercise	: 50%

- Lab Record and Internal Assessment : 25%
- Viva voce : 25%

Details of course contents and allotted time

S.No	Topic	Allotted time (hours)	
		Lecture	Practical
1.	The Cell: Development of Cell Theory, Ultra-structure of Eukaryotic and Prokaryotic Cell, Introduction to Cell Organelles, membrane structure and function	3	
2.	Biomolecules: Introduction to nucleic acids (DNA and RNA), proteins, Carbohydrates and Lipids, Metabolic Pathways	4	
3.	DNA: Heredity Material, Biochemical structure of DNA, Semi-conservative mode of DNA replication	5	
4.	Genes and chromosomes: Organization of Genes in Eukaryotes and Prokaryotes, Chromosomes	2	
5.	Central Dogma, gene regulation and the Genetic code of life: Flow of genetic information through transcription and translation, control of gene expression (transcriptional and translational control, cis and trans regulatory elements), deciphering genetic code, codon bias	5	
6.	Cell Division: Mitosis and Meiosis	2	
7.	Principles of Genetics: Mendel's Laws of Inheritance, non-mendelian patterns of inheritance, Qualitative vs. quantitative traits, Chromosomal theory of inheritance (linkage and crossing over)	5	
8.	Mutations, Molecular Evolution	2	
9.	Practical Training: Introduction to Molecular Biology Laboratory: Introduction to laboratory ethics, biosafety and Good Lab Practices, preparation of buffers, solutions, handling micropipettes, introduction to the basic instrumentation of a molecular biology laboratory		12

S.No	Topic	Allotted time (hours)	
		Lecture	Practical
10.	Practical Training: DNA Extraction Plasmid and Plant Genomic DNA extraction		16

The course is reviewed and commented by the following experts.

1. Dr. TV Ramanaiah (Former Director, DBT, Government. of India, Presently Biotech Regulatory Affairs Manager, Pioneer Hi-bred)
2. Dr. Arvind Kapur (Managing Director, Nunhems Seeds)
3. Prof Uday Kumar (University of Agricultural Sciences, Bangalore)

Suggested Readings:

The Cell: A Molecular Approach Authors: Cooper GM (2000) Sunderland (MA): Sinauer Associates, Inc.

Molecular Cell Biology Authors: Lodish H; B Arnold; Zipursky S L; Matsudaira P; Baltimore D; Darnell J E (2000) WH Freeman & Co.

Essentials of Cell Biology: An Introduction to the Molecular Biology of Cell. Authors: Bruce Alberts; Dennis Bray; Alexander Johnson; Julian Lewis; Martin Raff; Keith Roberts; Peter Walter (2002) Garland Science

Principles of Biochemistry Authors: Nelson and Cox (2003) Lehninger, Macmillan press

Biochemistry Authors: Berg JM; Tymoczko JL; Stryer L (2002) WH Freeman & Co.

Modern Genetic Analysis Authors: Griffiths AJF, Gelbart WM, Miller JH, Lewontin RC (1999) WH Freeman & Hall

Principles of Genetics Authors: Sinustad PD, Simmons M (1997) John Wiley

Course No.:	PGDR 102
Course title:	Principles of Genetic Engineering and bio-analytical techniques
Number of credits:	4
Credits (Lectures : Practical)	2: 2
No. of Hours	28: 56
Course coordinator:	Dr Manu Aggarwal Dr Sanjay Saxena (Practical Training)

Course outline:

The aim of this core-course is to acquaint the students to the versatile bio-analytical tools and techniques of recombinant DNA technology that constitute the methodological repertoire of genomics research. Introduction to basic principles and techniques of genetic engineering will be provided spanning across topics relating to extra-ordinary power of recombinant DNA enzymes, plasmids as cloning vectors, transformation and expression, cloning strategies, *E. coli* transformation, markers and reporters for screening and selection and labeling techniques. Amongst the bio-analytical techniques, microscopy, spectrophotometry, electrophoresis, PCR and ELISA would be covered. A sound knowledge of such basic techniques is fundamental for sensitizing students on how these basic techniques have been innovatively employed and have contributed to generation of new knowledge as well has impacted agriculture biotechnology. Related practical will be covered alongside.

Evaluation procedure

Theory and Practical	: 50%:50%
Theory	
▪ Quizzes	: 20 %
▪ 2 minor tests	: 40% (20 % each)
▪ 1 major test (end semester)	: 40%
Practical	
▪ Practical Exercise	: 50%
▪ Lab Record and Internal Assessment	: 25%
▪ Viva voce	: 25%

Details of course contents and allotted time

S.No	Topic	Allotted time (hours)	
		Lecture	Practical
1.	Electrophoresis: Agarose and polyacrylamide gel electrophoresis, ELISA	2	7
2.	Instrumentation: Microscopy, Spectrophotometry	3	

S.No	Topic	Allotted time (hours)	
		Lecture	Practical
3.	Versatile enzymes for genetic engineering and rDNA technology: Restriction enzymes, DNA modifying enzymes: (DNA Polymerases, RNA Polymerases, Nucleases, Kinases, Phosphatases, Ligases)	5	7
4.	Cloning vectors: Plasmids as vectors for cloning and transformation/expression, cloning strategies	3	7
5.	<i>E. coli</i> transformation: CaCl ₂ /RbCl ₂ method, electroporation, PEG-mediated transformation, Micro-injection	2	14
6.	Selection and screening of recombinant transformants: Introduction to marker and reporter genes, selection strategies	3	7
7.	Probe labeling	1	
8.	Nucleic Acid Hybridizations: Blotting and hybridizations (northern and southern), Western Blotting,	5	
9.	PCRs and RT-PCRs	4	14

The course is reviewed and commented by the following experts.

1. Dr. TV Ramanaiiah (Former Director, DBT, Government. of India, Presently Biotech Regulatory Affairs Manager, Pioneer Hi-bred)
2. Dr. Sanjeev Kalia (Pioneer Hi-Bred)
3. Prof Uday Kumar (University of Agricultural Sciences, Bangalore)

Suggested Readings:

Principles of Genetic Manipulation Authors: Primrose SB, Twyman RM and Old RW (2001) Blackwell Science Ltd, MA 02148-5020, USA

Molecular Biotechnology: Principles & Applications of Recombinant DNA Author: Glick BR and Pasternak JJ (2003) ASM Press

Principles and Techniques of Biochemistry and Molecular Biology

Edited by: Keith Wilson and John Walker (2005) CPL Scientific Publishing Services Limited

An Introduction to Genetic Engineering Edited by: Desmond S. T. Nicholl Cambridge University Press February 2002

An Introduction to Molecular Biotechnology: Molecular Fundamentals, Methods and Applications in Modern Biotechnology Edited by: Michael Wink (2006) Wiley

Course No.:	PGDR 103
Course title:	Biotechnology in Agricultural sector
Number of credits:	3
Credits (Lectures: Practical)	2: 1
No. of Hours:	28 : 28
Course coordinator:	Dr Anandita Singh Dr Sanjay Saxena (Practical Training)

Course outline:

The broad objective of the present core course is to define the purview of plant biotechnology and to create awareness on how it impacts on agriculture sector at large. In this respect, the core course will begin with acquainting the students to the classical plant biotechnology practices viz. plant tissue culture principles and techniques; breeding approaches for crop-improvement. The advent of transgenic technology that typically underpins plant biotechnology in post genomic era will be explained in sufficient detail in relation to multifarious gene transfer methods. Concepts on plant metabolic engineering will be introduced. A heavy emphasis will be given to the case studies and examples illustrating how GM technology has evolved as a principle driver for bringing about a sustainable development.

Evaluation procedure

Theory and Practical	: 50%:50%
Theory	
▪ Quizzes	: 20 %
▪ 2 minor tests	: 40% (20 % each)
▪ 1 major test (end semester)	: 40%
Practical	
▪ Practical Exercise	: 50%
▪ Lab Record and Internal Assessment	: 25%
▪ Viva voce	: 25%

Details of course contents and allotted time

S.No	Topic	Allotted time (hours)	
		Lecture	Practical
1.	Introduction to agriculture systems in India	2	

S.No	Topic	Allotted time (hours)	
		Lecture	Practical
2.	Principles of Plant Tissue Culture: Tissue-culture media, Concept of Totipotency, Organogenesis, Somatic Embryogenesis, Haploid production, Triploid production, Zygotic embryo culture, Embryo rescue Protoplast culture, Applications of Transgenesis: Genetic transformation of plants, Production of pathogen free plants), Clonal propagation, Production of secondary metabolites, <i>in-situ</i> conservation	8	
3.	Introduction to transgenic technology: Conventional Breeding Versus Transgenesis, Methods of Gene Transfer to plants, Agrobiology, Ti and Ri Plasmids and <i>Agrobacterium</i> mediated transformation, Direct DNA transfer to plants (particle gun, electroporation, Silicon carbide fibers, PEG mediated, <i>in-planta</i>), Chloroplast Transformation	10.5	
4.	Transgenic Technology for Crop Improvement and Sustainable development: GM technology for conferring resistance to biotic (Insect, Virus, Fungal, Nematodes) and abiotic stresses (Salt tolerance, Heavy metal tolerance, Cold tolerance, Drought tolerance), Enhancing the nutritional quality, Herbicide-resistant GM plants, Molecular Pharming, Metabolic Engineering, Transgenic Plants and Waste Management Biotechnology	7.5	7
5.	Practical Training: Tissue culture: Introduction to basic micro-propagation techniques and regeneration protocols		7

S.No	Topic	Allotted time (hours)	
		Lecture	Practical
6.	Plant Genetic Transformation: <i>Agrobacterium</i> co-cultivation method, Introduction to particle gun, selection of transgenics (antibiotic selection, GUS-histochemical staining)		7
7.	GM Detection: Plant DNA isolation, Agarose gel electrophoresis, qualitative and quantitative analysis, Polymerase chain reaction for GM diagnostics		7

The course is reviewed and commented by the following experts.

1. Dr. TV Ramanaiah (Former Director, DBT, Government. of India, Presently Biotech Regulatory Affairs Manager, Pioneer Hi-bred)
2. Dr. Arvind Kapur (Managing Director, Nunhems Seeds)
3. Prof Uday Kumar (University of Agricultural Sciences, Bangalore)

Suggested Readings:

Books:

Applied Plant Biotechnology Authors: Chopra VL; Malik VS and Bhat SR (1999) Oxford University Press

Plant, Genes and Crop Biotechnology Authors: Chrispeels MJ; Sadava DE (2003) Jones and Bartlett Publishers, Inc.

Practical Applications of Plant Molecular Biology Authors: Henry RJ (1997) Chapman & Hall

Plant Cell and Tissue Culture Edited by: Vasil IK and Thorpe TA (1995) Springer Verlag

Plant Cell, Tissue and Organ Culture Edited by: Gamborg OL and Phillips GC (1995) Springer-Verlag

Articles:

Daniell H; Datta R; Varma S; Gray S and Seung Bum Lee (1998) Containment of herbicide resistance through genetic engineering of the chloroplast genome *Nature Biotechnology* 16: 345 - 348

Paul JJ; Hooykaas and Schilperoort RA (1992) *Agrobacterium* and plant genetic engineering. *Plant Molecular Biology* 19: 15-38

Part 2: Regulations in Agricultural Biotechnology (30 Credits)

Course No.:	PGDR 104
Course title:	Intellectual Property Rights and Trade Issues
Credits (Lectures-Tutorial-Term paper):	3-2-3
Hours (Lectures-Tutorial-Term paper):	42-28-42
Course coordinator:	Prof Kershen Drew and MV Shiju

Course outline

This is a comprehensive course on Intellectual Property Rights and Trade issues in Agriculture Bio technology. The purpose of this course is to give a detailed analysis of the IPR and Trade issues in agriculture biotechnology. The course is designed in 5 modules. The first module is an overview. Through this module the participants should become acquainted with a basic overview of the legal system, the concept of intellectual property rights, the various types of IPRs, and the application of IPRs in agriculture. In module 2 the participants will be introduced to a basic understanding of intellectual property rights in living matter (microorganisms, plants, animals) in three jurisdictions – the United States of America, Canada, and the European Union. These three jurisdictions have different approaches to IPRs in living matter. Participants need to have basic knowledge about the similarities and differences between these different approaches. Students should gain insights into the implications of these different approaches with regard to what can be protected by IPRs, what types of IPR rights exist in each of these jurisdictions, and the legal consequences of these contrasting approaches to IPRs in living matter. By the conclusion of the 3rd module it is expected that the participants would become familiar with the concept of intellectual property rights at the global level. Participants will learn about the distinction between domestic IPRs and international organizations and treaties that discuss IPRs. For India these international organizations and treaties are particularly important because much of Indian intellectual property law is in direct response to international treaties and India's participation in those treaties. Module 4 is an analysis of the laws, regulations and public policy of India with regard to IPRs in living matter. The last module in this course is meant to give the participants an understanding about the substantive issues, processes, methods, and concerns that relate to taking a research project from an abstract concept to a farmer's fields.

Evaluation procedure

- Assignment : 30%
- 2 minor tests : 30% (15% each)
- 1 major test (end semester) : 40%

Details of course contents and allotted time

S. No	Topic	Allotted time (hours)	
		Lecture	Tutorials
Module 1	OVERVIEW	10	4
	<p><i>An Introduction to the Legal System</i> Common Law and Civil Law systems Constitution, Statutes, Rules, Regulations Judicial System, Importance of Precedents Administrative set up</p>	2.5	
	<p><i>A Theoretical Introduction to IPRs</i> A Brief History of IP protection Difference between Tangible and intangible property Rationale for IPR Reasons Public Research v. Private Research Public Goods v. Private Goods Concept of Agriculture Inventions IPRs in Living Matters Product v. Process Open Source v. Limited Monopoly.</p>	2.5	
	<p><i>Types of IPRs</i> Patents Copyright Trade Marks Trade Secrets Plant Variety Protection Geographical Indications Farmers' Rights Traditional Knowledge</p>	2.5	

S. No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	<p><i>IPRs in Agriculture</i></p> <p>Discovery compared to Invention</p> <p>Impact of Biotechnology on Law</p> <p>Natural Products and Hybrid Products</p> <p>Patentability criteria: New (novelty), Non Obviousness (Inventive step) and Industrial application (Usefulness)</p> <p>Case : <i>Diamond v. Chakrabarty</i></p> <p>Public Morality</p> <p>Biological Deposits (Budapest Treaty)</p> <p>Full Patent and Sub patent protection. An example of a subpatent exists in the Australian sub patent statute.</p> <p>Utility patents compared to Plant Variety Protection Acts</p>	2.5	

S. No	Topic	Allotted time (hours)	
		Lecture	Tutorials
Module 2	COMPARATIVE INTELLECTUAL PROPERTY RIGHTS IN LIVING MATTER	9.5	5
	<i>United State Patent Law</i> Patent Act of 1952 – basic statutory provision Basic Case Law: Diamond v. Chakrabarty Plants: Ex parte Hibberd Animals: Ex parte Allen	1.5	
	<i>United States Patent Law</i> Policy on Patenting Animals – the Harvard Oncomouse patent United States Patent and Trademark Office [USPTO] Examination Guidelines Plant Patent Act – the statutory provisions (brief discussion to compare and contrast to utility patents and plant variety certificates)	1.5	
	<i>United States Plant Variety Protection Act</i> Plant Variety Protection Act – the statutory provisions Basic Case Law J.E.M. Supply Co. v. Pioneer Hi-Bred Co. Discussion of the relationship between patents and plant variety certificates	1.5	
	<i>Canadian Patent and Plant Variety Protection</i> Patent Act and Plant Variety Protection – basic statutory provisions Basic Case Law – Supreme Court of Canada decisions The Harvard Oncomouse decision (animals) The Schmeiser decision (plants)	1.5	

S. No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	<p><i>EU Patent and Plant Variety Protection</i> Patent Act and Plant Variety Protection – basic statutory provisions Basic European Patent Office Decisions The Harvard Oncomouse Patents on Genes in Plants Relationship between patents and plant variety certificates</p>	1.5	
	<p><i>Infringement Cases</i> Statutory Provisions from Canada and the United States Canadian Federal Trial Court decision in the Schmeiser case United States decision(s) (select from various Monsanto cases against farmers for patent infringement) Commentary on Monsanto infringement actions United States decision(s) (select from various PVPA infringement cases) Infringement issue between Argentina and the United States in re soya</p>	2	
Module 3	INTERNATIONAL IPR ISSUES	6.5	5
	<p><i>World Intellectual Property Organization (WIPO)</i> WIPO Treaties Patent Convention Treaty (1970) Patent Law Treaty (proposed, 2000) Substantive Patent Law Treaty – in negotiations WIPO Organizational Structure International Law compared to Domestic Law</p>	1.5	

S. No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	<i>World Trade Organization (WTO)</i> General Discussion about WTO Organizational structure WTO agreements Relevant Provisions of Trade Related Intellectual Properties (TRIPS) Dispute Resolution Decisions related to TRIPs	1.5	
	<i>International Union for the Protection of New Varieties of Plants (UPOV)</i> 1978 and 1991 Conventions: Comparison UPOV Institutional Structure.	1.5	
	<i>Other International Instruments</i> Plant Genetic Resources for Food & Agriculture (PGRFA) IP Aspects Conventional on Biological Diversity (CBD) IP aspects	2	
Module 4	IPRs ON LIVING MATTER: INDIAN POSITION	8	8
	<i>Forms of Protection most related to plants</i> Seed Act (1966) Proposed Seed Bill 2005 (comparisons of provisions) Protection of Plant Varieties and Farmer's Rights Act (PPV & FR) Geographical Indications Law	1.5	

S. No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	<p><i>Indian Patents Act (1970)</i> Amendments to Indian Patent Act (2005) Statutes Regulations Manual Scope of patentability and public morality issues Case law Gleevec Case (High Court at Madras) High Court at Calcutta (Dimminaco AG Case)</p>	1.5	
	<p><i>Acquiring IPRs in living matter in India</i> Product and Process Patents Genomic Tools and Technologies (Software tools, Reaction Chemistries, Equipment) Sequences per se (DNA, RNA, cDNA, ESTs, GSS) Genes, Micro-organisms, Plants, and Animals Case Study from Indian Scientific Agricultural Research</p>	1.5	
	<p><i>IP Applications and Procedures</i> Description of Patent Document Patent drafting: patent and prior art searches, articulation of Claims Nuances of filing, prosecution and defending patent application Comparison of the practical aspects between general (utility patents) and plant variety protection. Length of time to obtain IPR protection; costs of application.</p>	1.5	

S. No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	<p><i>Case Studies of Intellectual Property Dispute in India</i></p> <p>Bt Cotton in India Issues on patentability Protection under PPV & FR Contracts Issues on pricing Indian opposition to US and EU IPRs relating to neem, turmeric and basmati</p>	2	
Module 5	COMMERCIALIZATION OF AGRICULTURAL BIOTECHNOLOGY RESEARCH	8	6
	<p><i>Beginning Commercialization</i></p> <p>Setting Research Priorities – Choosing Research Projects and the concept of patent thickets Freedom to Operate (FTO) opinions Patent Searches and Restrictions on commercialization Decisions about how to proceed with research Legal opinion about IPRs and contractual obligations Material Transfer Agreements (MTAs)</p>	1.5	

S. No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	<p><i>Licensing and Contracts</i></p> <p>What are the functions of licenses and contracts with respect to IPRs in living matter?</p> <p>Examples of Licenses and Contracts</p> <p>Humanitarian Clauses</p> <p>Market Differentiation clauses</p> <p>Research Institute/University Policies about IPRs</p> <p>Incentives for Scientists – incentives professionally and economically</p> <p>Public/Private Partnerships – seeking a true partnership or short-term gain</p>	1.5	
	<p><i>Management of IPR Assets</i></p> <p>The concept of IPR asset management</p> <p>Public/Private Partnerships – seeking a true partnership or short-term gain</p> <p>Incentives for Scientists – incentives professionally and economically</p> <p>Valuation of assets</p> <p>Working a Patent</p> <p>Compulsory Licensing</p> <p>Advice about future research and development – making choices about the allocation of research and development resources and funds</p>	1.5	

S. No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	<p><i>IPR Enforcement</i></p> <p>Culture of Respect for IPRs</p> <p>Societal Attitudes</p> <p>Legislative Attitudes</p> <p>Judicial Attitudes</p> <p>Farmer Attitudes – Farmer Rights</p> <p>Political Attitudes</p> <p>Techniques of Enforcement</p> <p style="padding-left: 40px;">Infringement Actions</p> <p style="padding-left: 40px;">Injunctions</p> <p style="padding-left: 40px;">Criminal Enforcement</p> <p>Treaty Obligations regarding Customs</p> <p>Import issues into countries with strong IPRs in living matter</p>	1.5	
	<p><i>From Lab to Land</i></p> <p>Case Studies about Commercialization</p> <p>The Scientific Issues about efficacy, testing, safety, impact, etc.</p> <p>The Trade Issues</p> <p>IPRs and Regulations</p> <p>Political Issues</p> <p>Market acceptance Issues</p> <p>Two cases studies:</p> <p>Case Study One – bio-fortification (Golden Rice) – public research and development</p> <p>Case Study Two – pharmaceutical agricultural biotechnology (Ventria Biosciences Rice) – private research and development</p>	2	

The course is reviewed and commented by the following experts.

1. Dr. Karim Meredia (Professor, Institute of Agriculture, Michigan State University, USA)
2. Dr. Arvind Kapur (Managing Director, Nunhems Seeds)

Suggested Readings:

W.R.Cornish, *Intellectual Property*, 4th edn., Sweet & Maxwell, London,1999.

P.Narayan, *Patent Law*, 3rd edn., Eastern Law House, Calcutta, 2001.

Jayashree Watal, *Intellectual Property Rights in the WTO and Developing Countries*, Oxford, Delhi, 2001.

F.H.Erbisch and K.M. Maredia(Eds.), *Intellectual Property Rights in Agricultural Biotechnology*, 2nd edn., CABI Publishing,Oxon,2004.

N.S.Gopalakrishnan, "Biotechnology and Intellectual Property Protection", *Journal of Intellectual Property Rights*, Vol.XIX, pp. 1 – 30, 1995.

N.S. Gopalakrishnan, "Patenting Micro-organisms under TRIPS – Concerns for India", *Asian Biotechnology and Development Review*, Vol.3,No.1, 1999.

Biswajit Dhar and Sachin Chaturvedi, "TRIPS and CBD", *Asian Biotechnology and Development Review*, Vol.3, No.1, 1999.

Sachin Chaturvedi, "Agricultural Biotechnology and New Trends in IPR Regime: Challenges before Developing Countries", *Economic and Political Weekly*, March 30,2002,pp. 1212 – 1222.

Usha Menon, "IPRs and Agricultural Development", *Economic and Political Weekly*, July 6, 1991, pp.1660 – 1667.

S.K.Verma, "Access to Biological and Genetic Resources and their Protection",*Journal of Indian Law Institute*, Vol.43,2001,pp. 1 – 24.

T.V.S.Ramamohan Rao, "Biotechnology Inventions and the Patent Regime", *Asian Biotechnology and Development Review*, Vol.9 No.2, 109 –121,2007.

C.Niranjan Rao, "Indian Seed System and Plant Variety Protection", *Economic and Political Weekly*, February 21, 2004, 845 – 852.

N.Lalitha, "Intellectual Property Protection for Plant Varieties Issues in Focus", *Economic and Political Weekly*, *Economic and Political Weekly*, May 8,2004, 1921-1927.

Suresh Pal, et.al., "Intellectual Property Rights in Plant Breeding and Biotechnology: Assessing Impact on the Indian Seed Industry", *Economic and Political Weekly*, January 20,2007, 231 – 240.

M.K.D.Rao and V.K.Gupta, "IPR and Sharing of Biological Research Materials in R&D", *Journal of Intellectual Property Rights*, Vol.8, 2003, pp. 123 – 129.

R.K.Raina, " Commercial Transfer Agreements of New Plant Varieties and Materials Thereof", *Journal of Intellectual Property Rights*, Vol.8, 2003,pp. 130 – 137.

Malathi Lakshmikumar, "Patenting of Genetic Inventions", *Journal of Intellectual Property Rights*, Vol.12, 2007, pp.45 – 56.

Anandita Singh, et al, "Genomics and IP: An Overview", *Journal of Intellectual Property Rights*, Vol.12,2007, pp.57 – 71.

Course No.:	PGDR 105
Course title:	Principles of Regulation
Credits (Lectures-Tutorial-Term paper):	1-1-1
Hours (Lectures-Tutorial-Term paper):	14-14-14
Course coordinator:	MV Shiju

Course outline

The overall goal of this course is to provide the participants with sufficient familiarity with regulatory approaches to agricultural biotechnology. The course is designed in 4 modules. The first module provides an overview of risk analysis, risk assessment, and risk management issues related to agricultural biotechnology. The second module is an analysis of two early documents in agriculture biotechnology regulation. The goal here is to have the participants identify fundamental issues about regulations in agricultural biotechnology as reflected in these early documents. The course then proceeds to discuss about the various approaches to regulation of agricultural biotechnology in different countries of the world and to compare and contrast these various approaches and the underpinning rationales that explain these comparisons and contrasts. The concluding module helps the participants to think about paradigms of regulation; the consequences of over-regulation and about appropriate regulation and legitimate considerations related to regulation.

Evaluation procedure

- Assignment : 30 %
- 2 minor tests 15*2 : 30%
- 1 major test (end semester) : 40%

Details of course contents and allotted time

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
Module 1	SCIENTIFIC APPROACHES TO RISK ANALYSIS, RISK ASSESSMENT, RISK MANAGEMENT	3	3

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	<p><i>Competing Models of Risk</i> Models of Risk Consideration – Scientific Risk Rationality versus Social Risk Rationality Breeding techniques compared – unique risks? More precise? Identification of Possible Risks Human and Animal Health Environmental Impact (including biodiversity) Quantification of Hazard Distinguish between risk analysis, risk assessment and risk management Use the Bt trait as a case example throughout this course on Regulation of Biotechnology</p>	2	
	<p><i>The Concept of Precaution in Regulation</i> Compare and contrast the Precautionary Approach to the Precautionary Principle Attitude towards agricultural biotechnology: prohibition, precautionary, permissive, or promotional</p>	1	
Module 2	BRIEF HISTORY OF REGULATION	1	
	<p><i>Early Documents about Agricultural Biotechnology and Regulation</i> U.S. Coordinated framework (1986) OECD Guidelines (1989)</p>	1	

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
Module 3	COUNTRY COMPARISONS ABOUT APPROACHES TO BIOTECHNOLOGY REGULATION	8	7
	US Regulatory Approach U.S. approaches to Biotechnology Regulation USDA-APHIS (plant pest, agronomic) US-EPA (environmental assessment) US-FDA (food and feed safety) Approvals – and consequences if not approved (StarLink) Suggested that one day be spent on regulation by each of the three major regulatory agencies used in the United States.	3	
	<i>European Union Regulatory Approach</i> EU approaches to Biotechnology Regulation Commercial Release Food Safety evaluation Labeling Approvals – and consequences if not approved (Bt 11, Romania and soya)	3	
	<i>Asian Countries</i> China and Philippines	1	
	Two other countries for comparison Canada and South Africa	1	
Module 4	THINKING ABOUT APPROPRIATE REGULATION	2	4
	Over-regulation and its Consequences Consequences of Regulatory Choice Impact on Scientific Research, particularly on public research Field Trials versus commercial release Direct Regulatory Costs Lost Opportunity Costs Delays and Social Behaviors Human and Environmental Costs	1	

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	<i>Thinking about Regulation for Agricultural biotechnology</i> Designing an Appropriate Regulatory System Harmonization between regulatory systems Mutual Recognition of Regulatory Decisions Health, Food Safety, Environmental Impacts Event Regulation versus Trait crop-by-crop regulation Agricultural Biotechnology, Pharmaceutical Biotechnology, and Industrial Biotechnology – same or different regulatory approaches? Trade Considerations Consumer Acceptance Political Considerations	1	

The course is reviewed and commented by the following experts.

1. Dr. TV Ramanaiah (Former Director, DBT, Government. of India, Presently Biotech Regulatory Affairs Manager, Pioneer Hi-bred)
2. Dr. Karim Meredia (Professor, Institute of Agriculture, Michigan State University, USA)

Suggested Readings

Office of the Gene Technology Regulatory, *Risk Analysis Framework* (January 2005. Chapter 5.

Office of the Gene Technology Regulatory, *Risk Assessment and Risk Management Plan*, Consultation Version, Cotton (February 2003).

Office of the Gene Technology Regulatory, *Risk Assessment and Risk Management Plan*, Consultation Version, Canola (April 2003).

Grant E. Isaac & William A. Kerr, "GMOs at the WTO – A Harvest of Trouble", *Journal of World Trade* (2003), 37(6): 1083-1089.

Kent J. Bradford et. al, "Regulating Transgenic Crops Sensibly: Lessons from Plant breeding, Biotechnology and Genomics", *Nature Biotechnology* (April 2005), 23(4): 439-443.

Letters to the editor and response by the authors, *Nature Biotechnology* (July 2005), 23(7): 785-789.

Government of Canada, *A Canadian Perspective on the Precautionary Approach/Principle* (September 2001)

Stan Benda, "A New Socio-Political Dialectic: The Precautionary Approach v the Precautionary Principle" (author's manuscript, March 2007)

Ryan Hill, Sam Johnston, & Cyrie Sendashonga, "Risk Assessment and Precaution in the Biosafety Protocol", *RECIEL* (2004), 13(3): 263-369.

Indur M. Goklany, "Applying the Precautionary Principle to Genetically Modified Crops", *Policy Study Number 157* (CSAB, Washington University, St. Louis, August 2000)

Office of Science & Technology (USA), *Coordinated Framework for Regulation of Biotechnology* (June 1986).

Organization of Economic Cooperation & Development (OECD), *Recombinant DNA Safety Considerations* (July 1986).

UN Conference on Environment and Development, Environmentally Sound Management of Biotechnology, *Agenda 21*, Rio de Janeiro, June 1992 .

S.R.Rao, "Status of Regulation of Genetically Engineered Products in Selected Countries – An Analysis", *Asian Biotechnology and Development Review*, 23 – 38.

Jikun Huang, et. al., "Agriculture Biotechnology Development, Policy and Impact in China", *Economic and Political Weekly*, July 6, 2002, 2756 – 2761.

Course No.:	PGDR 106
Course title:	Environmental Safety
Credits (Lectures-Tutorial-Term paper):	1-0-0
Hours (Lectures-Tutorial-Term paper):	14-0-0
Course coordinator:	Dr. Karen Hokanson, University of Minnesota/Dr Vibha Dhawan

Course outline:

The primary objective of this course is to give the students an understanding of the main environmental risk issues associated with genetically engineered crop plants, and to explore the methodologies for assessing and managing those risks. The students will be challenged to consider the magnitude of the risk relative to the complexity of the experimental approaches to assess the risk. The course will stress the separation of environmental risks associated with field trials from those associated with a commercial release. The course will also explore potential benefits to the environment associated with products of biotechnology in agriculture. Students will be introduced to fundamental concepts at the center of environmental risk assessment including the risk equation, baselines for comparison, and the concept of familiarity and a systematic approach to risk assessment including the approaches outlined by different international sources. The course will include topics relating to confinement measures for field trials and the information considered for the commercial approval. The lectures will also include a description of defined approaches to the assessment of gene flow and its consequences, and will include examples from the literature of studies to assess gene flow and its consequences. Overview of approaches to non-target risk assessment and insect resistance management would be provided. The students will be familiarized to the potential impacts of Bt crops on soil ecosystems including micro- and macro-organisms, the proposed methodologies to test this with Bt crops, and the strengths and weaknesses of those approaches. The candidates will explore some of the proposed methods to monitor for the impacts of GE crops following commercial approval, and the pros and cons of implementing a monitoring proposal. They will also be exposed to scientific approaches to environmental risk assessment including specific biometrical methodologies.

Evaluation Procedure:

Participation in class discussions	:10%
Reading response papers	: 20%
Confined Field Trial Exercise	: 10%
Background Biosafety Biology Document	: 25%
Pros/cons paper on issue of choice	: 35%

Details of course contents and allotted time

S. No	Topic	Allotted time (hours)	
		Lecture	Tutorials
Module 1: OVERVIEW OF ENVIRONMENTAL RISK ASSESSMENT FOR GM CROPS			
	Introduction to Environmental Risk Assessment: Approaches to Risk Assessment: Cartagena, IPPC, OECD, UNIDO, Scientific Issues for Environmental Risk Assessment	1	
	Case Studies on Environmental Risk Assessment and Management: Bt Cotton in India (<i>Dr. Mahender Sharma of MAHYCO</i>), HT Rice in US	1	
	Case Studies: Bt maize in Philippines, Virus, resistance papaya Bt cotton in China		0.5
	Characterization data for environmental risk assessment	1	
Module 2: ENVIRONMENTAL SAFETY OF CONFINED FIELD TRIALS			
	Case Study: Confined Field Trial Application		1
Module 3: ENVIRONMENTAL SAFETY FOR COMMERCIAL PRODUCTION (SCIENTIFIC ISSUES)			
	Assessment of Gene Flow and Its Consequences	1	
	Assessment of Risks to Non-Target Organisms	1	
	Insect Resistance Management: Overview of insect resistance management strategies, Description of the BBI IRM projects for dual gene brassicas and Bt brinjal in India	1	
	Case studies: Bt Cotton, Cabbage & Cauliflower		0.5
	Effects of Bt Crops on Soil Ecosystems	0.5	
	Effects of HT Crops on Weed	0.5	
	Post Commercialization Monitoring	0.5	
	Environmental Benefits and Environmental Applications	0.5	
Module 4: SYSTEMATIC APPROACH TO ENVIRONMENTAL RISK ASSESSMENT			

S. No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	Bio-statistics for Biosafety Analysis	4	
	Risk Assessment Exercise: Bt brinjal, golden mustard, drought tolerant rice		1

The course is reviewed and commented by the following experts.

1. Dr. TV Ramanaiah (Former Director, DBT, Government. of India, Presently Biotech Regulatory Affairs Manager, Pioneer Hi-bred)
2. Dr. Morven A. McLean, President, AGBIOS Inc
3. Dr. Veena Chhotray (Former Secretary, Ministry of Environment and Forests, Chairman, Genetic Engineering Approval Committee, Presently Secretary, Ministry of Social Justice and Empowerment)

Suggested Readings:

- 1) Olivier Sanvido, Michèle Stark, Jörg Romeis and Franz Bigler (2006) Ecological impacts of genetically modified crops: Experiences from ten years of experimental field research and commercial cultivation, Agroscope Reckenholz-Tänikon Research Station ART
- 2) Philip J Dale, Belinda Clarke, and Eliana MG Fontes (2002) Potential for environmental impact on transgenic crops. *Nature Biotech* 20: 567-57
- 3) Anthony J. Conner, Travis R. Glare, and Jan-Peter Nap (2003) The release of genetically modified crops into the environment. Part II. Overview of ecological risk assessment. *Plant Journal* 33: 19-46
- 4) Ammann, K., Jacot, Y. and Rufener Al Mazyad, P. (2001) Safety of genetically engineered plants: an ecological risk assessment of vertical gene flow. In *Safety of Genetically Engineered Crops* (Custers, R., ed.). Zwijnaarde, Belgium: Flanders Interuniversity Institute for Biotechnology, pp. 60-87 (<http://www.vib.be/downloads/bioveiligheidseducatie/report.pdf>).
- 5) Bertolla, F. and Simonet, P. (1999) Horizontal gene transfers in the environment: natural transformation as a putative process for gene transfers between transgenic plants and micro-organisms. *Res. Microbiol.* 150: 375-384
- 6) Weblink (AgBIOS home Page): <http://www.agbios.com/articles.php> provides a comprehensive compilation of relevant articles, studies, reports, reviews and proceedings related to Agriculture biotechnology and regulations including Environmental Safety
- 7) National consultation on Biosafety aspects related to Genetically Modified Organisms, prepared by Biotech Consortium India Limited (BCIL) in associated with Department of Biotechnology (DBT), September 2004.
- 8) Biosafety issues related to transgenic crops prepared by Biotech Consortium India Limited (BCIL) sponsored by Ministry of Environment and Forests, January 2004
- 9) Traynor P L, Frederick R J, Koch, M. Biosafety and Risk Assessment in Agricultural Biotechnology. The Agricultural Biotechnology Support Project, Institute of International Agriculture, Michigan State University, USA. 2002.

- 10) Biosafety: Issues & challenges. Ed. D D Verma, Ministry of Environment and Forests, 2006.
- 11) Report of the Task Force on Application of Agricultural Biotechnology – Summary in print form and detailed report in a CD (Prof. M S Swaminathan)
- 12) Handbook for IBSC Members (Handbook and a CD) Biosafety Newsletter
- 13) List of Transgenic crops approved for conducting contained limited field trials including multi-location field trials
- 14) List of Bt Cotton varieties approved for commercial cultivation in the various zones.

Course No.:	PGDR 107
Course title:	Food Safety
Credits (Lectures-Tutorial-Term paper):	3-2-3
Hours (Lectures-Tutorial-Term paper):	42-28-42
Course coordinator:	Dr. Hector Quemeda, Calvin College, Michigan

Course Outline:

The primary objective of this course is to give the students an understanding of the main risks associated with food. It will involve issues related to pesticide and contaminated water usage as well as post harvest/contaminants of processed food etc. Students will be exposed to need of studying issues related to safety of GM food crops, especially related to allergenicity and toxicity. Information available and the usage of various databases that are available will be discussed in detail. Students will also be exposed to food regulations in different parts of the globe. Infrastructure requirements for testing of food especially of GM origin will be discussed. The food safety issues vs. commercial policies of the company will be taken up as case studies.

Evaluation procedure

- Assignment : 50 %
- 1 minor test : 20 %
- 1 major test (end semester) : 30 %

Details of course contents and allotted time

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
Module I. FOOD SAFETY CONTEXT			
	Introduction to Food Safety: Food Safety: Challenges & Perspective (Introduction to unit: expectations, structure; Microbial hazards (sanitation); Chemical hazards (pesticide); Case studies of adulteration (Indian faculty); Status of food safety protection: US; Status of food safety protection: India (presented by Indian faculty)	6	
	Food Safety Regulation: Food safety regulation in US; Food safety regulation in India	3	

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	Food safety regulation in the EU	4	
	Field visits: Food manufacturing plant-safety precautions, Food testing lab (microbial and chemical hazards), GMO testing lab	6	
PART II. GMO FOOD SAFETY ASSESSMENT			
	Food safety issues associated with GMO's, Codex guidelines for food safety assessment	2	1
	Toxicology: Tests (Standards, Infrastructure); Bioinformatics	1	
	Allergenicity Tests (Standards, Infrastructure)	1	
	Introduction on databases for allergenicity		2
	Equivalence	1	
	Whole food feeding studies: Rationale, design of studies & costs, Standards & Infrastructure	2	
PART III. NON-SAFETY RELATED ISSUES LINKED TO FOOD SAFETY REGULATIONS			
	Traceability and the global market: Segregation, Identity preservation, Product tracking, Labeling, Costs	3	
	Case Studies: Starlink, Adventitious presence, thresholds, Countries accepting food only, Soybean oil and other highly processed products	5	2
	Case Studies on Food Company Policies: Gerber, McDonald's—Bt potato story, Kellogg Grocery Supplier: EU, US	2	
PART IV: PROJECT WORK			
		Hours allocated	
	Introduction to detailed case study projects	3	
	Case study: Bt potato in South Africa	1.5	
	Introduction to case studies: Flavr Savr Tomato, <i>Bt</i> maize, HT soybean, PRSV-resistant papaya	1.5	

The course is reviewed and commented by the following experts.

1. Dr. Karim Meredia (Professor, Institute of Agriculture, Michigan State University, USA)
2. Dr. Morven A. McLean, President, AGBIOS Inc

Suggested Readings:

- 1) Beever D E and Kemp CF (2000) Safety issues associated with the DNA in animal feed derived from genetically modified crops. A review of scientific and regulatory procedures. Nutrition Abstracts and Reviews Series B: Livestock Feeds and Feeding 70: 175-182
- 2) WHO (1991) Strategies for Assessing the Safety of Foods Produced by Biotechnology. Report of a Joint FAO/WHO Consultation. World Health Organization, Geneva.
- 3) Doerfler W, Schubbert R, Heller H, Kammer C, Hilger-Eversheim K, Knoblauch M, Remus R (1997) Integration of foreign DNA and its consequences in mammalian systems. Trends in Biotechnology 15: 297—301
- 4) Conner, A.J. (1997) Genetically Engineered Crops. Environmental and Food Safety Issues. The Royal Society of New Zealand, Miscellaneous Series 39, 1–34
- 5) Nordlee, J.S., Taylor, S., Townsend, J., Thomas, L., Bush, R. 1996. Identification of a brazil-nut allergen in transgenic soybeans. New England J.Med. 334:688-692. <http://www.geo-pie.cornell.edu/issues/brazilnut.html> provides a case study on Brazil nut case
- 6) Graham Brookes, Neville Craddock, Bärbel Kniel (2005) The Global GM Market, Implications for the European Food Chain: An analysis of labelling requirements, market dynamics and cost implications. Independent report by Agricultural Biotechnology Europe
- 7) Luca Bucchini and Lynn R. Goldman Starlink Corn: A Risk Analysis (2002) Environmental Health Perspectives. 110: 76-8
- 8) Weblink (AgBIOS home Page): <http://www.agbios.com/articles.php> provides a comprehensive compilation of relevant articles, studies, reports, reviews and proceedings related to Agriculture biotechnology and regulations including Food Safety
- 9) The JRC Advanced Training Series. Detecting GMOs, European Commission, Director General, Joint Research Centre (<http://www.jrc.cec.eu.int>)

Course No.:	PGDR 108
Course title:	Multilateral Agreements and India's Obligations
Credits (Lectures-Tutorial-Term paper):	3-0-0
Hours (Lectures-Tutorial-Term paper):	42-0-0
Course coordinator:	MV Shiju

Course outline

The present course is intended to give a basic understanding of various multilateral agreements covering issues in Agricultural Biotechnology. The course is divided into four modules. As the participants in the Post-Graduate Diploma in Regulations in Agricultural Biotechnology are likely from science and public policy backgrounds, they will have little familiarity with legal concepts and legal institutions, including international law concepts and institutions. In Module I, the course provides a very basic, fundamental introduction to international law and international agreements. Information acquired through Module I thus allows the participants to better understand and comprehend the specific international agreements discussed in the remaining classes of the course. In the subsequent modules the following Conventions/ Agreements are introduced: *Convention on Biological Diversity; General Agreement on Tariffs and Trade; Sanitary & Phytosanitary Agreement; Agreement on Technical Barriers to Trade; Codex Alimentarius; Treaty on Plant Genetic Resources for Food and Agriculture*. The discussions on each of these Conventions/Agreements etc. will center on overview, scope and purpose, substantive provisions and India's obligations and responses so far. As there is a separate course on *Trade Related Aspects of Intellectual Property Rights* the same is not covered in this course.

Evaluation procedure

- Assignment : 30%
- 2 minor tests : 30% (15% each)
- 1 major test (end semester) : 40%

Details of course contents and allotted time

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
Module 1	INTRODUCTION TO INTERNATIONAL LAW – THE LAW OF TREATIES	6	

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	<p><i>International Law vs. Domestic Law</i> Nature of International Law Obligation of states towards other states United Nations: Structure</p> <p><i>Law of Treaties</i> Process of Negotiations Coming into effect in international law and domestic law Enforcement Treaties, Conventions and Protocols – explanations</p>	3 3	
Module 2	CONVENTION ON BIOLOGICAL DIVERSITY (CBD)	12	
	<p><i>History</i> Negotiations Coming into effect Signatories Institutional Structure</p>	2	
	<p><i>Substantive Provisions of CBD</i> Scope and purpose Capacity building Benefit sharing Dispute Resolution Information sharing Genetic Resources</p>	2	

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
Module 3	WORLD TRADE ORGANIZATION: GENERAL AGREEMENT ON TARIFFS AND TRADE (GATT), SANITARY & PHYTOSANITARY AGREEMENT (SPS), TECHNICAL BARRIERS TO TRADE AGREEMENT (TBT)	13	
	<i>History</i> Negotiations Coming into effect Signatories Institutional Structure	3	
	<i>The WTO and Agricultural Trade</i> Overview of the GATT Agreement Scope and purpose Dispute Resolution Focus on the Uruguay Round related to Agriculture Focus on the Doha Round related to proposals about Agriculture A Comparison of WTO structure with the CBD structure	2	
	<i>Sanitary and Phyto-sanitary standards (SPS)</i> Overview of substantive standards of SPS Dispute Resolution example: Argentina, US, Canada versus EU relating to the Moratorium on Approvals for Transgenic Foods and Crops.	2	
	<i>Technical Barriers to Trade (TBT)</i> Overview of substantive standards of TBT Compare and contrast TBT to SPS Dispute Resolution examples (US vs EU on Beef Hormone Case) Potential Argentina, Canada and US vs EU Agricultural Biotechnology Regulations	2	

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	<p><i>Relationship between WTO and CBD/BSP</i></p> <p>Compatibility of Trade Agreements and Environmental Agreements</p> <p>Legal interrelationship between these international agreements</p> <p>Customary International Law standards</p>	2	
	<p><i>Enactment into Indian Domestic Law</i> 1</p> <p>Indian Domestic Statutes (Parliamentary Reports)</p> <p>Judicial Interpretation</p>	2	
Module 4	CODEX ALIMENTARIUS (Codex)	5	
	<p><i>History</i></p> <p>Institutional Structure through World Health Organization (WHO and Food & Agricultural Organization (FAO) Guidelines</p> <p>Customary International Law</p> <p>Negotiation Process - steps in the adoption process</p>	2	
	<p><i>Codex guidelines on food related to Transgenic Crops</i></p> <p>Discussions and proposals related to agricultural biotechnology and food</p> <p>Guidelines related to scientific standards for food safety</p>	1	
	<p><i>Codex on labeling of food derived from transgenic crops</i></p> <p>Discussions and proposals related to labeling</p>	1	
	<p><i>India's response to Codex Alimentarius</i></p> <p>Food Labeling Laws</p> <p>Import of transgenic food (soybeans)</p>	1	
Module 5	PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE	6	

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	<i>Plant Genetic Resources for food and agriculture</i> History Negotiations Coming into effect Signatories Relationship between the PGRFA and the CBD/BSP Institutional Structure	2	
	<i>Substantive Provisions of the PGRGA</i> Capacity building Benefit sharing Dispute Resolution Information sharing	2	
	<i>The concept of biopiracy</i> Ownership of Genetic Resources Advance Informed Agreement Traditional Knowledge Private Public Partnerships Public Research Institution Case Studies – use examples from India	1	
	<i>India's response to PGRFA</i> Indian Domestic Statutes (Parliamentary Reports) Judicial Interpretation	1	

The course is reviewed and commented by the following experts.

1. Dr. TV Ramanaiah (Former Director, DBT, Government. of India, Presently Biotech Regulatory Affairs Manager, Pioneer Hi-bred)
2. Dr. Morven A. McLean, President, AGBIOS Inc
3. Dr. Veena Chhotray (Former Secretary, Ministry of Environment and Forests, Chairman, Genetic Engineering Approval Committee, Presently Secretary, Ministry of Social Justice and Empowerment)

Suggested Readings:

Sir Robert Jennings and Sir Arthur Watts, *Oppenheim's International Law*, 9th edn., Longman, London, 1997.

Malcom N. Shaw, *International Law*, 5th edn., Cambridge, 2003.

Sean D. Murphy, "Biotechnology and International Law", *Harvard International Law Journal*, Vol.42,2001, pp. 47 – 138.

Robin R Churchill and Geir Ulfstein, "Autonomous Institutional Arrangements in Multilateral Environmental Agreements: A Little Noticed Phenomenon in International Law", *American Journal of International Law*, Vol.94,2000, pp.623 – 659.

Jessica S Jerome, "How International Legal Agreements speak about Biodiversity", *Anthropology Today*, Vol.14, 1998, pp.7 – 9.

Handbook on the Convention on Biological Diversity, Secretariat of the Convention on Biological Diversity, www.cbd.int/doc/handbook

Barbara Eggers and Ruth Mackenzie, "The Cartagena Protocol on Biosafety", *Journal of International Economic Law*, 2000, pp.525 – 543.

Asif H. Qureshi, "The Cartagena Protocol on Biosafety and the WTO – Co-existence or Incoherence", *International and Comparative Law Quarterly*, Vol.49,2000, pp.835 – 853.

Peter Phillips and William A Kerr, "The WTO versus the Biosafety Protocol for Trade in GMOs", *Journal of World Trade*, Vol.34, 2000, pp.63 – 75.

Robert Falkner, "Regulating Biotech Trade: The Cartagena Protocol on Biosafety", *International Affairs*, Vol.76, 2000, pp.299 – 313.

Sachin Chaturvedi and S.R.Rao, "Biotechnology and International Trade Regime: Options Before Developing Countries", *Asian Biotechnology and Development Review*,

K.P.S. Chauhan and R.K Tyagi, "Implications of the Protocol on Biosafety: An Indian Perspective", *Asian Biotechnology and Development Review*, Vol.3, 2000, No.2.

Understanding Codex, Codex Alimentarius, www.codexalimentarius.net

Course No.:	PGDR 109
Course title:	Regulatory Systems in India
Number of credits:	1
No. of lectures:	14
Course coordinator:	Dr Abha Agnihotri

Course Outline

This course is an integrative course providing an overview in regulatory structures governing agricultural biotechnology in India. As the participants have already covered courses dealing with the Principles of Regulation, Environmental Safety and Food Safety, this course is designed to provide an overview of various mechanisms in place with special context to India. The main focus of the course will be to understand the approval process involved under the 1989 rules dealing with hazardous microorganisms and genetically engineered organisms. The course is designed in four modules. The first module is intended to give an introduction to the different legislations dealing with the subject and the various ministries and departments implementing the same. It also introduces the concept of hazardous substances, the legal response to them and the application of precautionary principle in the Indian context. The following two modules deal in a detailed way the different regulatory systems in India. The concluding module deals with role of judiciary. Many a decisions of these regulatory authorities are challenged in the higher courts today. This module will explain the concepts of judicial review and public interest litigation. It will also cover some of the leading cases on the field.

Evaluation procedure

Term Paper	: 30%
Minor test	: 30%
End semester	: 40%

Details of course contents and allotted time

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
Module 1	Introduction	2	
	Regulatory Systems in India- An overview of the different legislations Different Ministries and Departments Administrative set up	1	
	Hazardous Substances Application of Precautionary Principle in India	1	
Module 2	Regulation of GMOs	7	

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
	Environment (Protection) Act, 1986 and National Environment Policy, 2006	1	
	Rules for the Manufacture, Use and Import, Export and Storage of Hazardous Micro Organisms/ Genetically Engineered Organisms/ cells and plants, 1989.	1	
	Regulatory Structure – Powers and Functions of RDAC, IBSC, RCGM, GEAC, SBCC and DLC.	2	
	The process of approval Guidelines and Protocols	1	
	Plant Quarantine Order	1	
	Recommendations of different Commissions	1	
Module 3	Other Issues	3	
	Regulatory structure under the <ul style="list-style-type: none"> • Industries (Development and Regulation) Act, 1951 • Biological Diversity act, 2002 • Protection of Plant Varieties and Farmers Rights Act, 2000 • Drugs and Cosmetics Act, Exim Policy • Right to Information Act 	1 1 1	
Module 4	Judicial Review	2	
	Role of Judiciary and Judicial Review Principles of Natural Justice Public Interest Litigation; case studies	2	

The course is reviewed and commented by the following experts.

1. Dr. TV Ramanaiah (Former Director, DBT, Government. of India, Presently Biotech Regulatory Affairs Manager, Pioneer Hi-bred)
2. Dr. Arvind Kapoor (Managing Director, Nunhems Seeds)

3. Dr. Veena Chhotray (Former Secretary, Ministry of Environment and Forests, Chairman, Genetic Engineering Approval Committee, Presently Secretary, Ministry of Social Justice and Empowerment)

Suggested Readings:

Report of the Task Force on Application of Agricultural Biotechnology, Ministry of Agriculture, Government of India, May 2004.

National Biotechnology Development Strategy (Draft), Department of Biotechnology, Ministry of Science and Technology, Government of India.

Shyam Divan and Armin Rosencranz, *Environmental Law and Policy in India*, 2nd edn., Oxford, New Delhi 2005, Ch. 4.

Lianchawii, "Biosafety in India: Rethinking GMO Regulation", *Economic and Political Weekly*, September 24, 2005, pp.4284 – 4289.

Relevant provisions of:

- Environment (Protection) Act, 1986
- Industries (Development and Regulation) Act, 1951
- Biological Diversity Act, 2002
- Protection of Plant Varieties and Farmers Rights Act, 2000
- Drugs and Cosmetics Act, 1940.
- Rules for the Manufacture, Use and Import, Export and Storage of Hazardous Micro Organisms Genetically Engineered organisms or Cells, 1989.
- Recombinant DNA Guidelines, 1990.
- Revised Guidelines, 1994
- Guidelines for Research in Transgenic Plants, 1998.

Course No.:	PGDR 110
Course title:	Bioethics, Public Awareness and Communications
Number of credits:	1
No. of lectures:	14
Course coordinator:	Dr Vibha Dhawan

Course Outline:

The present course is structured as two distinct modules. The first module seeks to sensitize the candidates to wider issues concerning the ethics in biotechnology. The topics covered would explore the socio-economic issues relating to biotechnology and their broader impact on the society. The ethics relating to transparency in scientific validation of regulatory procedures shall form a critical aspect of the course as also topics concerning research priorities and ownership issues. Stem cell transplantation, xeno-transplantation and the impact of rDNA based medicines on the public morality would be discussed. The second module of this course shall emphasize on the mechanisms for generating public awareness in biotechnology and importance of effective communication strategies especially from the point of view of agriculture biotechnology.

Evaluation procedure

Term Paper:	30%
Minor test:	10%
End semester	60%

Details of course contents and allotted time

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
Module 1: Bioethics			
	Overview of Bioethics and ethical issues in biotechnology	2	
	Socio-economic issues and broader impact on society	2	
	Transparency and Scientific Validation on regulatory procedures	1	
	Research priorities and ownership issues	2	
Module 2: Public Awareness and communication strategies			
	Developing effective communication strategies	3.5	
	Dissemination of effective Scientific information in common language	3.5	

The course is reviewed and commented by the following experts.

1. Dr. Morven A. McLean, President, AGBIOS Inc
2. Dr. Sanjeev Kalia (Monsanto India Inc.)
3. Dr. Veena Chhotray (Former Secretary, Ministry of Environment and Forests, Chairman, Genetic Engineering Approval Committee, Presently Secretary, Ministry of Social Justice and Empowerment)

Suggested Readings:

1. Ethical aspects of agricultural biotechnology (1999) EFB Task Group on Public Perceptions of Biotechnology, Cambridge Biomedical Consultants
2. Report of the panel of eminent experts on ethics in food and agriculture (2000) Food and agriculture organization of the United Nations Rome (2001) Editing, design, graphics and desktop publishing: Editorial Group FAO Information Division
3. Thompson P (1995) The spirit of the soil: agriculture and environmental ethics. London, Routledge
4. Sagar A, Daemmrich A and Ashiya M (2000) The tragedy of the commoners: biotechnology and its publics. Nature Biotechnology 18: 2-4
5. Members of Working Group, Nuffield Council on Bioethics (2004) The use of genetically modified crops in developing countries
6. Weblink (AgBIOS home Page): <http://www.agbios.com/articles.php> provides a comprehensive compilation of relevant articles, studies, reports, reviews and proceedings related to Agriculture biotechnology and regulations including Ethics in Agricultural Biotechnology

Course No.:	
Course title:	Administrative Law
Number of Credits:	3 (2.25-0.75-0)
Number of lectures and tutorials:	33-9-0
Course coordinator	Prof. D Banerjea (Former Professor, NUJS and Dean of LBS)

Course outline

The purpose of Administrative Law is to maintain rule of law and to uphold constitutional governance at all levels while in the exercise of public power. To define simply Administrative law is the law relating to administration and it determines the organisation, powers and duties of administrative authorities. (Sir Ivor Jennings). This course will examine all aspects of administrative law, its nature, scope and functions, the nature and control of delegated power including the rule making, judicial review and new legislative developments in the administrative powers and functions. A critical and comparative examination of administrative law in the Common Law and Civil Law countries will be undertaken in this course to study different models. Substantial portion of the course will be taught through case studies

Evaluation procedure

- 2 Minor exams (15*2) = 30%
- Class discussion/Tutorials= 20%
- Final exam = 50%

Details of course content and allotted time

Modules	Allotted time (hours)	
	Lecture	Tutorial
1: Introduction to Administrative Law	6	0
(a) Meaning and objective- evolution, nature, the historical need and purpose- theories of Administrative law- Constitutional law and Administrative law (fundamental rights and administrative discretion)	2	
(b) Different models-Common law – continental Europe and US	2	
(c) Changing nature of state-welfare state to a very loose contractual type of state-reduction in functions-transferring powers to private corporations- possible new law to ensure fair, effective and efficient performance of the state/administration in this situation?	2	
2: Institutions	5	2
Administrative Structure in India Central, State and Local administration, Panchayati Raj Institutions- powers and functions	3	1

Modules	Allotted time (hours)	
	Lecture	Tutorial
Tribunals- New regulatory agencies Changing pattern of government and governance, legal status- critically examination of present arrangements. New developments	2	1
3: Natural Justice	2	1
Principles of Natural Justice - Application and Non Application of Natural Justice	2	1
Disciplinary proceedings and Natural Justice - Effect of Failure of Natural Justice		
4: Delegated Legislation	4	1
Principles and power under delegated legislation and Sub delegation of legislative powers-Judicial Control over delegated legislation	2	
Constitutionality, ultra virus, implied restrictions, delay in rule making, exclusion of judicial review, legislative and parliamentary control and other controls - procedural and substantive safeguards in its exercise.	2	1
5: Administrative Jurisdiction	3	1
Administrative Powers and Adjudication	1	
Discretion, Discrimination and Arbitrariness- grounds of judicial review (arbitrariness, bad faith, non-exercise of power, non-application of mind, etc)	2	1
6: Remedies	6	2
Judicial Review- concept High Court's Superintendence over Tribunals-Writ Jurisdiction of the Supreme Court and the High Court-Appeal to Supreme Court-Specific Writs	2	1
Other statutory judicial remedies-General remedies (like CPC), injunction, delectations and specific remedies	2	
Statutory Control Mechanism - CVC, Ombudsman, - experiences and case studies of different countries Right to Information Government Privilege not to produce documents	2	1
7: Governments Contracts	3	1
Formulation of Government Contracts: Estoppel, Proportionality, Government Contracts and the Constitution,	3	1

Modules	Allotted time (hours)	
	Lecture	Tutorial
Statutory discretion-Tort and Restitution, tortious liability of the government-compensation, Wavier, Public Interest Litigation		
8: Right to Information	4	1
Access to information -Official secrecy- Right to Information Act-Official Secrets Act-Position in other countries	4	1
Total	33	9

The course is reviewed and commented by the following experts.

Prof N R Madhava Menon
Member
Centre-State Commission, New Delhi

Prof M P Singh
Vice Chancellor
National University of Juridical Science, Kolkata

Suggested readings

1. Halsbury's Laws of India, Volume 1, Administrative Law, LexisNexis Butterorths, New Delhi 2004
2. P P Craig, Administrative Law (Indian edition), 3rd Edition, Universal Law Publishing, New Delhi 2004
3. The Constitution of India, selective comments by P M Bakshi, Universal Law publishing LTD.
4. Working a Democratic Constitution The Indian Experience Granville Austin, 2000 OUP
5. D D Basu's Constitutional Law of India
6. Administrative Law, I.P. Massey 5th Edition, 2001, Reprinted 2003. Eastern Book Company, Lucknow
7. Constitutional and Administrative Law, By R Brazier, S De Smith, Paperback Penguin
8. M.P. Jain Administrative Law
9. C K Takwani Lectures on Administrative Law, Edn. Reprint 2003
10. Administrative Law, Ninth Edition, William Wade and Christopher Forsyth, 2004, OUP
11. Sathe, Administrative Law,

12. Brown and Bell (formerly Garner and Brown), French Administrative Law (Clarendon Press, Oxford, 5th ed. 1998)
13. Mahendra P. Singh, German Administrative Law in Common Law Perspective (Springer, Berlin, 2nd ed., 2001)
14. Peter Cane, Administrative Law (4th edn.)

Other readings:

1. Administrative Law, Ninth Edition, William Wade and Christopher Forsyth, 2004, OUP
2. Administrative Law, I.P. Massey 5th Edition, 2001, Reprinted 2003. Eastern Book Company, Lucknow
3. The Constitution of India, selective comments by P M Bakshi, Universal Law publishing LTD.
4. Constitutional and Administrative Law, By R Brazier, S De Smith, Paperback Penguin
5. Mahendra P. Singh, German Administrative Law in Common Law Perspective (Springer, Berlin, 2nd ed., 2001)
6. Brown and Bell (formerly Garner and Brown), French Administrative Law (Clarendon Press, Oxford, 5th ed. 1998)
7. Halsbury's Laws of India, Volume 1, Administrative Law, LexisNexis Butterorths, New Delhi 2004
8. The Constitution of India, selective comments by P M Bakshi, Universal Law publishing LTD.
9. David H. Rosenbloom and Richard D. Schwartz, Handbook Of Regulation And Administrative Law. New York: Marcel Dekker, 1994
10. Jacint Jordana and David Levi-Faur (ed) The Politics of Regulation-Institutions and Regulatory Reforms for the Age of Governance, Edward Elgar Publishing 2004
11. Sathe, Administrative Law
12. Halsbury's Laws of India, Volume 1, Administrative Law, LexisNexis Butterorths, New Delhi 2004
13. Administrative Law, I.P. Massey 5th Edition, 2001, Reprinted 2003. Eastern Book Company, Lucknow
14. Administrative Law, Ninth Edition, William Wade and Christopher Forsyth, 2004, OUP
15. M.P. Jain Administrative Law
16. Sathe, Administrative Law
17. Administrative Law, Ninth Edition, William Wade and Christopher Forsyth, 2004, OUP

18. Mahendra P. Singh, German Administrative Law in Common Law Perspective (Springer, Berlin, 2nd ed., 2001)
19. The Constitution of India, selective comments by P M Bakshi, Universal Law publishing LTD.
20. David H. Rosenbloom and Richard D. Schwartz, Handbook Of Regulation And Administrative Law. New York: Marcel Dekker, 1994
21. M.P. Jain Administrative Law
22. D D Basu's Constitutional Law of India
23. Administrative Law, Ninth Edition, William Wade and Christopher Forsyth, 2004, OUP
24. Halsbury's Laws of India, Volume 1, Administrative Law, LexisNexis Butterorths, New Delhi 2004
25. P P Craig, Administrative Law (Indian edition), 3rd Edition, Universal Law Publishing, New Delhi 2004
26. Mahendra P. Singh, German Administrative Law in Common Law Perspective (Springer, Berlin, 2nd ed., 2001)
27. Halsbury's Laws of India, Volume 1, Administrative Law, LexisNexis Butterorths, New Delhi 2004
28. P P Craig, Administrative Law (Indian edition), 3rd Edition, Universal Law Publishing, New Delhi 2004
29. Mahendra P. Singh, German Administrative Law in Common Law Perspective (Springer, Berlin, 2nd ed., 2001)
30. Right to Information Act, 2005
31. Official Secrets Act, 1923
32. Supreme court and High Court decision son Access to information and Official secrecy

Course No.:
 Course title: **Federalism and the Changing Patterns of Governance**
 Number of credits: 3
 Lectures-tutorial: 36-6-0
 Course coordinator: M.V. Shiju.

Course Outline

The federal system has become a popular form of governance ever since the adoption of the U.S. Constitution in 1787. Its popularity rests mainly on the fact that it brings about a sense of national integration maintaining at the same time elements of self-rule. India is often described as a Federal Constitutional Democracy. But there is no unanimity as to the nature of Indian federalism. Critics argue that the Indian set up seriously compromises the federal principle. The power of the federal government to impose president's rule in a state and the centralized planning system are often pointed out as evidences of this. It is in this context that this course looks at the nature of Indian federation and the changes that have taken place in governance over a period of time. The course is designed in 5 modules. The first module provides a conceptual basis to federalism. It looks into the theories of federalism and the need for it. The idea of a developmental state and the role of planning will provide the starting point for the discussions in this module. The second module is an attempt to look at the Constitutional provisions dealing with federal features of Indian Constitution. The Module starts with a discussion on the Constituent Assembly Debates. An attempt will be made to examine the factors that led to the adoption of a Constitution with strong unitary features as opposed to a grand confederation that was the idea when the constituent assembly met for the first time. The role of the judiciary in the federal set up is an important feature in this regard. The interpretation placed by the judiciary on these provisions will be looked into. Select major cases in the area will be discussed in detail. The third module discusses issues relating to fiscal federalism. The fourth module is an attempt at evaluating the changes that have taken place during the recent times. Globalization and decentralization have thrown open many a challenge and opportunity to the Indian federal set up. The concluding module looks at the challenges that the Indian federation is facing today. Three case studies will be undertaken in this regard, viz. Punjab, Kashmir and the North East. The challenges posed by the traditional forms of governance on the Indian Constitution and its adaptability to the constitution will be the focal points for discussion. Various commission reports and leading cases will be discussed in the course of the lectures.

Evaluation procedure

▪ Minor Test	20%
▪ Term Paper	30%
▪ End Semester Examination	50%
Total	100%

Details of course contents and allotted time

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
Module 1	<i>Conceptual Basis of Federalism</i>	4	
	Developmental State and Planning. Theories of Federalism.		

S.No	Topic	Allotted time (hours)	
		Lecture	Tutorials
Module 2	<i>Constitution and Federalism</i>	12	2
	Constituent Assembly Debates. Constitutional Provisions and Amendments. Judiciary and Federalism. Bureaucracy and Federalism. Law and Order and Federalism. Case Studies: <ul style="list-style-type: none"> • <i>State of West Bengal v. Union of India</i>, AIR 1963 S.C.1241. • <i>State of Karnataka v. Union of India</i>, (1977) 4 SCC 608. • <i>S.C. Advocates on Record Association v. Union of India</i>, (1993) 4 SCC 441. • <i>S.R. Bommai v. Union of India</i>, (1994) 3 SCC 1. • <i>In re Gujarat Gas</i> 		
Module 3	<i>Fiscal Federalism</i>	4	
	Revenue and Resources Allocation Finance Commission Planning Commission		
Module 4	<i>Globalization and Decentralization</i>	8	2
	73 rd & 74 th Constitutional Amendments. Panchayathi Raj Institutions. International Financial Institutions and State Governments. International Agreements and Union's Enlarged Powers.		
Module 5	<i>Challenges to Nation State and Federalism</i>	8	2
	Punjab and Kashmir. Regionalism and Political Parties. Conflict between Traditional and Constitutional Forms of Governance: A Case Study of the North East.		
	Total	36	6

The course is reviewed and commented by the following experts.

Prof Udayraj Rai
 National Law School of India University
 Bangalore

Prof M P Singh
Vice Chancellor
National University of Juridical Sciences, Kolkata

Suggested readings

- Paul R. Brass, *The Politics of India Since Independence*, Cambridge University Press: Cambridge, 1998.
- Terence J. Byres, *The State and Development Planning in India*, Oxford University Press: London, 1998.
- Stuart Corbridge, 'Federalism, Hindu Nationalism and Mythologies of Governance in Modern India', in Graham Smith edited *Federalism: The Multiethnic Challenge*, Longman: London, 1995.
- Balveer Arora and Nirmal Mukherjee, 'Introduction: The Basic Issues', in Balveer Arora and Nirmal Mukherjee edited *Federalism in India: Origins and Development*, Vikas Publishing House: New Delhi, 1992.
- Bhagwan D. Dua, 'India: Federal Leadership and Secessionist Movements on the Periphery', in Richard Sisson and Ramashray Roy edited, *Diversity and Dominance in Indian Politics*, Sage: New Delhi, 1990.
- Sanjib Baruah, 'Nationalising Space: Cosmetic Federalism and the Politics of Development' in *The Durable Disorder*, Oxford University: New Delhi, 2005.
- Krishna Tummala, 'India's Federalism Under Stress', *Asian Survey*, Vol. 32, June 1992.
- Rajni Kothari, 'India: the Congress System on Trial', *Asian Survey*, Vol. 7, February 1967.
- Granville Austin, *The Indian Constitution: Cornerstone of a Nation*, Oxford University, New Delhi, 1999.
- Granville Austin, *Working a Democratic Constitution: A History of the Indian Experience*, Oxford University, New Delhi, 2003.
- H.M.Seervai, *Constitution of India: A Critical Commentary*, 4th Edn.,
- H.M. Rajasekhara, "The Nature of Indian Federalism: A Critique", *Asian Survey*, Vol. 37, March 1997.
- M.P.Jain, *Indian Constitutional Law*, 5th Edn., Wadhwa, Nagpur 2003.

Course No.	
Course title:	Human resource development and education
Number of credits:	4 (2.5-1.5-0)
Number of lectures-tutorial:	(36-18-0)
Course coordinator:	Dr Jyotsna Bapat

Course outline

In the context of accelerated economic growth in India over the last decade and similar developing countries, there is a need for universalisation and formalisation of education in general, and primary education in particular. This throws up certain challenges for policy makers and implementers. The rationale for the course is to make you aware of the debates and challenges in the field of education and the impact that such universalisation of education has on different groups of population.

The course will encourage you to use such theoretical insights and methodological tools to develop your own critiques and contributions to questions related to education and schooling in the context of modern Indian state. While you will be exposed mainly to Indian case studies, a comparative perspective is encouraged for your assignments and term papers.

Evaluation procedure

- Minor tests : 20%
- Assignments : 20%
- Term paper : 20%
- Final examination : 40%

Tutorial:

Each student will be expected to make three presentations for the tutorial classes. These can be based on your assignments or topic of your choice.

First assignment is a discussion on a pre-selected reading or article. Second is to share observations from field or data that agree or contradict conclusions of a published article. Third, is a Term paper to be written on a pre selected topic.

Details of course content & allotted time

Module	Topic	Allotted time (hours)	
		Lectures	Tutorials
I 1	Why bother? 1. Production and reproduction	2	2
I 2	Investment in future Human Resource Development (HRD): 2. Concept,	6	2

Module	Topic	Allotted time (hours)	
		Lectures	Tutorials
	3. Definition 4. HRD through knowledge, education and information		
II 3	Education and development 5. Theory of transmission of knowledge: 6. Social reproduction, Cultural bias, Cultural transmission and minority cultures	4	2
II 4	Right to Education 7. UN MDG Universal commitments 8. National educational policy: School community interface Role of PRI in Universalisation of quality education	4	2
III 5	Education Practice 9. Modern education: Concept of literacy and formal education 10. Need for literacy and its implications to development	4	2
III 6	Present status 11. Status of basic education 12. Status of physical infrastructure in schools	4	2
IV 7	Bias in education access 13. Impact of formal education on different social groups and reservation policy: <ul style="list-style-type: none"> • women • Dalits • Tribal groups 	4	2
IV 8	Future challenges 14. Models of education and debates 15. Discrepancy in resource allocation in India by higher and basic education and populations benefited 16. perspectives and critiques related to current and relevant educational “problems” found in post-industrial societies	8	4
	Total	36	18

The course is reviewed and commented by the following experts.

Prof. R.K. Mutatkar
Honorary Professor of Medical Anthropology
School of Health Sciences, University of Pune
Pune 411 007 (India)

Prof. Amrit Srinivas
Department of Humanities and Social Sciences
Indian Institute of Technology, Delhi.

Suggested readings

1. UN : Millenium Development Goals, U N Publication 2000
2. PESLE “Enhancing the quality of school education International seminar proceedings”, June 26 to 29,2007 India Habitat Centre, Agakhan Foundation Programme for enrichment of school level Education (PESLE), 2007.
3. Seminar series SOAS 2006, (theories of learning)
4. Shukla, Sureschchandra and Rekha Kaul “*Education development and underdevelopment*” sage India, 1998
5. De, Anuradha, and Jean Drèze, et. al. *Public Report of Basic Education in India*. Oxford: Oxford University Press, 1999
6. Ramchandani Vimla: *Gender and social equity in primary education*, sage India Publication 2004)
7. *India Infrastructure Report 2007* 3i network, IDFC 2007
8. NIIT initiative (refer to web site),
9. Kabeer Naila, et al (Ed) *Child labour and the right to education in south Asia*”. 2003)
10. Amrik Singh *Fifty Years Of Higher Education In India: The Role Of The University Grants Commission* Sage India Publication, 2003

Course No.	
Course Title:	Management of Public and Not-for-Profit Organisations
Number of credits:	3 (3.5-0.5-0)
No. of Lectures – tutorial – practical:	36-6-0
Course coordinator:	Avantika Singh

Course outline

The objective of this course is to enable participants to develop a holistic understanding of issues and challenges in the management of public and not-for-profit organisations. The specialisation will enable participants understand characteristics of public organisations, the nature of bureaucracy, and emerging issues in management of public organisations. The first part of the course lays emphasis on the management of public organisations as an interdisciplinary field of study, and builds on the foundations of public administration, political science and management. The latter part of the course focuses on the management, structure, and operation of not-for-profit organisations. The course will enable students to analyse management issues and concerns in not-for-profit organisations and to set them within broader policy contexts. The course focuses on applicability of generic management practices to performance of functions in governmental as well as non-governmental context.

Evaluation Procedure

▪ Minor test	20%
▪ End-term examination	30%
▪ Seminars	50%

Details of course contents and allotted time

No.	Topic	Allotted time (hours)	
		Lecture	Tutorial
1.	Module 1: Introduction to Public Organisations <ul style="list-style-type: none"> • Introduction to public organisations • Organisational structure, bureaucracy • Policy implementation by street-level bureaucracy 	4	
2.	Module 2: Introduction to Not-For-Profit Organisations <ul style="list-style-type: none"> • Emergence of the “Third Sector” • Theorisations of “Civil Society” • Typologies of not-for-profit organisations • Governance of NGOs <ul style="list-style-type: none"> ○ Registration of NGOs under Societies Registration Act, Section 25 of the Companies Act, Charitable Trusts Act, FCRA, etc. 	4	
3.	Module 3: New Public Management (NPM) <ul style="list-style-type: none"> • The New Public Management versus the <i>Old</i> Public Administration Agencification, performance management, marketisation	4	2

No.	Topic	Allotted time (hours)	
		Lecture	Tutorial
4.	Module 4: Leadership and Managing Change in Public and NPOs <ul style="list-style-type: none"> • Leadership • Management of change 	4	
5.	Module 5: Managing Strategy in Public and NPOs <ul style="list-style-type: none"> • Strategic management • Stakeholder analysis 	4	
6.	Module 6: Finance in Public and NPOs <ul style="list-style-type: none"> • Financial management 	4	2
7.	Module 7: Control Systems in Public and NPOs <ul style="list-style-type: none"> • Management Information Systems • Performance management and control systems in public and not for profit organisations 	4	
8.	Module 8: Accountability of Public and NPOs <ul style="list-style-type: none"> • Transparency and Accountability in Government • Accountability and Legitimacy of NPOs 	4	
9.	Module 9: Managing Relations in Public and NPOs <ul style="list-style-type: none"> • Managing intergovernmental relations • Managing NPO-government relations • Managing donor relationships <ul style="list-style-type: none"> ○ Multilateralism ○ Bilateralism 	4	2
	Total	36	6

Core Texts

1. Edwards, Michael and David Hulme (1995) *Non-Governmental Organisations - Accountability and Performance: Beyond the Magic Bullet*. London: Earthscan.
2. Korten, David C. (1990) *Getting to the 21st Century: Voluntary Action and the Global Agenda*. West Hartford: Kumarian Press.
3. Peters, B.Guy and Jon Pierre (2003) *Handbook of Public Administration*. London: Sage.
4. Robbins, Stephen P. (2006) *Organizational Behavior*, 11th ed., New Delhi: Prentice Hall.
5. Robbins, Stephen P. (1993) *Organization Theory: Structure, Design And Applications*, 3rd ed., New Delhi: Prentice Hall.
6. Turner, Mark and David Hulme (1997) *Governance, Administration and Development*. New York: Palgrave.

Suggested readings

1. Barzelay, Michael (2001) *The New Public Management: Improving Research and Policy Dialogue*. Berkeley: University of California Press.
2. Clark, John (1990) *Democratizing Development: The Role of Voluntary Organizations*. Connecticut: Kumarian Press.
3. Edwards, Michael and David Hulme (eds.) (1997) *NGOs, States and Donors: Too Close for Comfort?* Basingstoke: Macmillan.
4. Fowler, A. (1997) *Striking a Balance: A Guide to Enhancing the Effectiveness of NGOs in International Development*. London: Earthscan.
5. Heady, F. (1996) *Public Administration: A Comparative Perspective, 5th ed.* New York: Marcel Dekker.
6. Hood, Christopher (2000) *The Art of the State: Culture, Rhetoric, and Public Management*. Oxford University Press.
7. Howell, Jude and Jenny Pearce (2001) *Civil Society and Development: A Critical Exploration*. Boulder: Lynne Rienner.
8. Lewis, David (2001) *The Management of Non-Governmental Development Organisations: An Introduction*. London: Routledge.
9. Lewis, David and T. Wallace, (eds.) (2000) *New Roles and Relevance: Development NGOs and the Challenge of Change*. West Hartford: Kumarian Press.
10. Peters, B.Guy (2001) *The Politics of Bureaucracy: A Comparative Perspective, 5th ed.* London: Routledge.
11. Pierre, Jon (ed.) (1995) *Bureaucracy in the Modern State: An Introduction to Comparative Public Administration*. Aldershot: Edward Elgar.
12. Simon, Herbert A., Donald W. Smithburg, Victor A. Thompson (1991) *Public Administration*, Piscataway: Transaction Publishers.
13. Sogge, David (ed.) (2002) *Give and Take: What's the Matter with Foreign Aid?* London: Zed Books.

Course No.
 Course title: **Poverty and development**
 Number of credits: 4 (3-1-0)
 Number of lectures-tutorial: (42 -14-0)
 Course coordinator: Dr Jyotsna Bapat

Course outline

The rationale of the course is to familiarise you with the debates and issues surrounding the concepts of poverty and development over the last few decades. You will be provided different perspectives from different disciplines and regions to understand the relationship between poverty and development. From a policy planning and implementation perspective you will be introduced to the challenges faced by the state in implementing poverty reduction programs in India, given its diversity. While you will be exposed mainly to Indian case studies, a comparative perspective is encouraged for your assignments and term papers

Evaluation Procedure

- Minor tests : 20%
- Assignments : 20%
- Term Paper : 20%
- Final examination : 40%

Tutorial:

Each student will be expected to make three presentations for the tutorial classes. These could be your assignments and term papers.

First assignment is to lead a discussion on a pre-selected reading or article. Second is a pre selected topic presented, as a debate. Third assignment is a term paper written on a pre selected topics to be presented in the class.

Details of course content & allotted time

Module	Topic	Allotted time (hours)	
		Lectures	Tutorials
I 1	Introduction: 1. Historical review of poverty as a concept	3	2
I 2	Poverty: Concepts and definitions 2. Health education and poverty: vicious cycle, 3. Global poverty: Absolute deprivation, relative	6	2

Module	Topic	Allotted time (hours)	
		Lectures	Tutorials
	deprivation, multiple deprivation 4. Urban versus rural poverty: 5. Social Exclusion: Formal/ informal labour, gender bias, and child labour		
III 3	Alternate Understanding : 6.Cultural notions of poverty – subjective poverty; 7. Criticism of concept of absolute poverty; class structure and its relationship with poverty	4	1
IV 4	Theoretical Analysis of Poverty 8. Capitalism and poverty 9. Colonization and poverty 10. Environment and poverty 11. Culture of poverty: its criticisms; the thesis of situational constraints 12. Human capabilities	8	3
V 5	Poverty: Ideology based Solutions 13. Functions of poverty thesis – its criticisms 14. Expansions of welfare policies: income vs. quality of life 16. Issues of governance 15.Marxist solutions	6	2
IV 6	State Policies for poverty eradication: 10. Role of state in defining and managing poverty 11. Strategies for managing poverty: Area development approach Economic development approach	8	2

Module	Topic	Allotted time (hours)	
		Lectures	Tutorials
	Social equity and reservations		
	Role of NGOs		
	Individual income based approach eg. SHG-Gramin Bank		
	12. Issues of governance in each of the strategies		
	13. Decentralisation for managing poverty		
	14. Future challenges	2	2
	Total	42	14

The course is reviewed and commented by the following experts.

Prof. Surender Jodhka
Social Systems Unit
Jawaharlal Nehru University
Delhi

Prof. Lakshmi Lingam
Women's studies Unit
Tata Institute of Social Sciences
Deonar
Mumbai

Suggested readings:

1. Allen, Tim and Alan Thomas.1992. *Poverty and Development in the 1990's*. Oxford University Press. Oxford.
2. Mohanty, et.al. eds. *Third World Women and the Politics of Feminism..* Indiana Press. Bloomington.
3. Reading: Shiva,Vandana. 1988. *Staying Alive*. Zed Books. London
4. Sudershan R and Pandey Suchi ed. 2007 Ensuring Public accountability through community action ISST
5. Sabir Ali ed. 2006 Managing Urban poverty Council for social Development
6. W. Aiken & H. LaFollette (eds.), *World Hunger and Moral Obligation*. New Jersey: Prentice-Hall.
7. FAO (2005): The State of Food Insecurity in the World 2005: Monitoring Progress towards the World Food Summit and the Millennium Development Goals. Rome: FAO.

8. Hardin, G. (1974): 'Lifeboat Ethics: The Case Against Helping the Poor', *Psychology Today*, No.: Sept. 1974.
9. Lewis, Oscar (1996 (1966)). "The Culture of Poverty.", in G. Gmelch and W. Zenner, eds.: *Urban Life*. Waveland Press.
10. (January 1998) "The culture of poverty". *Society* 35 (2): 7.
11. Herring, R. J. (2000): 'Political Conditions for Agrarian Reform and Poverty Alleviation', IDS Discussion Papers – 375
12. Kanbur, R. (2001): 'Economic Policy, Distribution and Poverty: The Nature of Disagreements', *World Development*, Vol. 29, No. 6: 1083-1094.
13. Maxwell, S. (2001): 'WDR 2000: Is There a New "New Poverty Agenda"'? *Development Policy Review*, Vol. 19, No. 1: 143-149.
14. Narayan, D. (2000): 'Poverty is Powerlessness and Voicelessness', *Finance & Development*, December 2000: 18-21.
15. OECD (1999): *DAC Scoping Study of Donor Poverty Reduction Policies and Practices*. London: Overseas Development Institute. (Chapter 1)
16. OHCHR (2004): *Human Rights and Poverty Reduction: A Conceptual Framework*. Geneva: United Nations.
17. Sen, A. (1994): 'Freedom and Needs: An Argument for the Primacy of Political Rights', *The New Republic* 210: 31-38.
18. Sen, A. (1999): 'Democracy as a Universal Value', *Journal of Democracy*, Vol. 10, No. 9: 3-17.
19. Sen, A. (2000): 'A Decade of Human Development', *Journal of Human Development*, Vol. 1, No. 1: 17-23.
20. Sengupta, A. (2005): 'Human Rights and Extreme Poverty', Report of the Independent Expert on the Question of Human Rights and Extreme Poverty, Economic and Social Council, United Nations, E/CN.4/2005/49.
21. *Human Development Report 2000*. Chapter 2
22. UNDP (2000b): *Human Development Report 2000*. Chapter 3
23. UNDP (2004): *Human Development Report 2004*, Chapter 1
24. Banik, Dan (ed.) (2006) *Poverty, Politics and Development: Interdisciplinary Perspectives*, Bergen: Fagbokforlaget

Course No.	
Course title:	Power sector policies, reforms and planning
Number of credits:	3
Number of lectures-tutorial:	41-1-0
Course coordinator:	R Ramanathan/J L Bajaj

Course Outline:

The course is designed to introduce students to the need for re-regulation of restructured electric utilities in India and legislative and policy changes to support institutional structures and mechanisms in power sector. The course also exposes the students to the current regulations and policies governing power sector in India and in some developed power markets.

Evaluation Procedure:

Term Papers and Presentations: Analysis of reforms in any Indian state (20%), Analysis of reforms in any region outside India (20%), Critical Commentary on any aspect of Electricity Act 2003/National Electricity Policy/Rural Electrification Programs/Regulations formed under EA 2003/Implementation of the provisions of EA 2003 (60%).

Details of course content and allotted time

S.No.	Topic	Time allotted (hours)		
		Lectures	Tutorials	Practical
1.	Indian Electricity Sector and Reforms <ul style="list-style-type: none"> • Existing Market Structure • Production and Consumption • Efficiency in operations • Problems of Networks • Financial Status • Economic and Political pressures for change 	2		
2.	Electricity Law <ul style="list-style-type: none"> • Legislations before reforms (1910, 1948) • Legislations after Reforms (1991, 1998, 2003) 	4	1	
3.	Regulatory Reform and Structural Change in Electrical Power Industry <ul style="list-style-type: none"> • State and Federal Regulatory Processes • Changing Structure and Regulation (in the light of 	35		
		1		
		2		
		2		

	Electricity Act 2003)			
	• Negotiations and Risk	2		
	• Regulation of Generation Companies	1		
	○ KP Rao Committee Report	2		
	○ Availability Based Tariff			
	○ Regulation of Captive Power Plants	2		
	○ International evidence of generation regulation	3		
		1		
	• Transmission Regulation and Access Pricing	2		
	○ Current Tariff Mechanisms	2		
	○ Regulation of NGC in UK	2		
	○ Regulation of Nordic Pools			
	○ Regulation of New York Pool	2		
	○ Transmission Regulation in Latin America and New Zealand	2		
		2		
	○ Lessons for India			
	• Regulation of Distribution Companies	2		
	○ Zoning			
	○ Ownership: Management Contracts, Transfer of Assets, Franchise	2		
		2		
	○ Price Regulation: Current Practice and Application of Incentive Regulation	1		
	○ Third Party Access			
	○ Management of Subsidies			
	• Coexistence of Bilateral contracts and spot markets			
	Total	41	1	

The course is reviewed and commented by the following experts.

Dr Anoop Singh
Assistant Professor
Department of Industrial and Management Engineering
IIT Kanpur

Dr Sanjay Singh
Assistant Professor
Department of Humanities and Social Sciences
IIT Kanpur

Suggested readings

1. Electricity Act 2003
2. Rao, S.L. *Governing Power*, TERI-Tata McGraw Hill
3. Joskow P.L. *Regulatory Failure, Regulatory Reform, and Structural Change in the Electrical Power Industry*, Brookings Papers: MicroEconomics 1989
4. Joskow P.L., Richard Schalensee. *Incentive Regulation of Electric Utilities*, Yale Journal on Regulation, Vol. 4: 1, 1986.
5. Shukla, P.R. et. al, *Electricity Reforms in India: Firm Choices and Emerging Generation Markets*, Tata McGraw Hill, 2004.
6. KP Rao Committee Report
7. Various Notifications of CERC on ABT, Open Access and Power Trading.
8. Morey, Mathew J. *Performance Based Regulation for Independent Transmission Companies*,
http://www.ksg.harvard.edu/hepg/Papers/Morey_performance.based.reg.itcs_1-19-03.pdf
9. Littlechild, S.C. (1988) "Spot pricing of electricity: arguments and prospects." *Energy Policy*, Aug: 398-403
10. Beesley, M.E. and Littlechild, S.C. (1989) "The regulation of privatized monopolies in the United Kingdom." *RAND Journal of Economics*, 20(3): 454-472
11. Littlechild, S. (2001) "Competition and regulation in the U.K. electricity industry (with a brief look at California)." *Journal of Applied Corporate Finance*, 13(4): 21-37
12. Littlechild, S. (2001) "Contracting out distribution services: addressing the concerns." *Power UK*, 87: 55-61
13. British Electricity Trading and Transmission Arrangements (BETTA), Material available on OFGEM website
14. Standard Market Design, Material available on FERC website and HEPG website
15. Various Reports on <http://www.pjm.com/index.jsp>

Course No.:	
Course title:	Public budgeting systems
Number of credits:	3 (28-14-0)
Number of lectures-tutorials-practical:	2-1-0
Course coordinator(s):	Dr S K Sarkar Dr K B L Mathur

Course outline

Coverage of theories and practices of public budgeting, analyzing issues in public finance, budgetary system in India, public expenditure management, the budgetary reforms, major revenue systems in central and state/local governments.

At the end of the course, students should

- Understand the concepts in public finance
- Acquire skills to understand the budgets in various levels of government
- Understand the economic and political theory related tax policy and fiscal policy decisions in India
- An understanding of plan-budget links
- An understanding of the public expenditure management

Evaluation procedure

Class participation:	5%
Tutorial/assignments:	10%
Project work/Term paper:	45% (Outline 5%; Presentation 10%; Term paper 30%)
Test (at the end of semester):	40%

Details of course contents and allotted time

Sr. No.	Contents	Time allotted (Hours)		
		Lecture	Tutorial	Practicals
	Module 1 Public budgeting: Theory and Practices Market failures & roles of Government The Macro Economic Framework The Fiscal-Monetary nexus The Logic of Budgeting Fiscal Management Framework Budget process and logic Budget cycles Budget strategies and politics The Institutional arrangements India and other country practices (UK, Australia)	4	2	0
	Module 2 Budgeting Structures and Institutions Central budget Spending, cycle, deficit and fiscal policy State and local budgets Centrally sponsored schemes Budget Methods and Practices	4	2	0

Sr. No.	Contents	Time allotted (Hours)		
		Lecture	Tutorial	Practicals
	Preparation of budget requests Cost estimations Budget execution Audit and evaluation Budget Classifications and Reforms Alternative budget classifications and the provision of government services Performance budget Program budget Gender budgeting Capital Budgeting Rationale and process of capital budgeting Problems in capital budgeting Cost-benefit analysis			
	Module 3 Revenue sources, structure, and administration Taxation Theories and Practices Criteria for evaluating revenue options Major tax structures Income Taxes Taxes on Goods and Services, User Fees and Charges Property Tax Role of IEBR in PSU investments Efficiency in resources allocations, redistributions, growth and stabilization	4	2	0
	Module 4 Fiscal reforms in India States debt reorganization FRBM State and local bodies' finances Changed role of foreign aid Reforms in tax structure Monitoring and evaluation	4	2	0
	Module 5 Debt Administration and Managing Funds Central, state, and local debt Concept of debt, types of bonds, debt structures and design Cash management Sustainability of public debt	4	2	0
	Module 6 Issues in fiscal federalism 12 th Finance Commission Recommendations: salient features	2	1	0
	Module 7 Public expenditure and poverty Public Expenditure Management Plan Budget Link Evaluation of public investment	6	3	0
	Total	28	14	0

The course is reviewed and commented by the following experts.

Dr Tapas Sen
NIPFP, New Delhi

Dr K B L Mathur
Former Joint Secretary
Ministry of Finance

Suggested readings:

1. Mikesell, John L (2007) Fiscal Administration: Analysis and Applications for the Public Sector, 7th Ed. Thomson
2. R D Lee, Jr., R Johnson and P Joyce (2004). Public Budgeting Systems 7th Edition, Jones and Bartlett Publishers
3. Public Budgeting. By David Nice (Belmont, CA: Wordsworth/Thomson Learning (2002)
4. India: Fiscal Reforms and Public Expenditure Management. JBIC Research Paper 11. September 2001. Available at website
5. India's Fiscal matters. By Parthasarathi Shome. OUP
6. India: Central Government Budgets 1947-48 to 2003-04. Edited by MM Surry

Course No.	
Course Title:	Population, gender and development
Number of credits:	3 (2.5-0.5-0)
No. of Lectures – tutorial – practical:	34-8-0
Course coordinator:	Dr Mala Narang Reddy

Course outline

This course is designed to give students an understanding of the interrelationship among population change, gender and socio-economic development. The course examines the factors responsible for demographic trends (mortality, fertility, and migration patterns), the role of gender in these processes and the impact of changing social and economic aspects of development on the lives of women and men.

The course will help students think critically and analyse how population policies have not been successful in linking means to the ends, and how they can be made more effective by including gender and other social dimensions.

The course will generate knowledge on the following aspects:–

(1) Why gender is important when considering development issues and the need to integrate population and gender into research and policy agendas (2) various population and gender parameters of development (3) issues and debates on population and gender in development in developing countries.

Evaluation Procedure (% of aggregate marks):

- Review (1000 words) : 15%
- 2 minor tests : 40%
- 1 major test (end semester) : 45%

Detailed of course contents and allotted time

S.No	Topic	Allotted time (hours)	
		Lectures	Class Discussion/tutorials
Part A. Introduction to the Concepts and Issues		14	2
1	Population and gender parameters of development; Concepts and definitions of population processes: fecundity, fertility, morbidity, mortality, CBR, CDR, and migration; social indicators of development (human development index)	2	
2	Gender insensitivity at academic and practice level; consequences of gender insensitive approach of development policies; <u>Population policy in India</u> and family planning programmes – critical evaluation	3	
3	Gender Disparity – Gender and kinship/gender and household/female-headed households/gender specific roles; Gender, land and other resources (women's rights)	3	
4	Population vs. Food Trends (population bomb in developing countries)	2	
5	<u>Global perspective</u> – Demographic change in a globalising world; gender at global level; relevance of demographic transition theory; Changing perspective on <u>population paradigm – demographic dividend</u> ; consequences of urbanization and industrialization on gender	4	

S.No	Topic	Allotted time (hours)	
		Lectures	Class Discussion/tutorials
Part B. Population, Gender & Development: Linkages and Challenges		16	4
6	Gender, Health and Mortality – Differential trends of mortality; HIV and AIDS (Gender relations in AIDS epidemic); state and population policies	3	
7	Ageing and Gender – Demographic, social and economic aspects of population ageing; state and care of the elderly	2	
8	Education and Development – Impact of education on differential fertility and mortality rates; gender gaps in education and development	2	
9	Culture, religion and demographic behaviour – Religions in India: Major categories, population, and distribution; religion and gender relations; regulation of sex, issues of premarital, extramarital, and homosexual relations; religion on drug abuse.	3	
10	Work and Gender – Participation of women in labour force; case studies from India and other countries	2	
11	Gender Based Migration – Migration: push and pull hypotheses and their relationship; aspects of internal migration and emigration – gender aspects of population movement; forced migration (induced migration (development project) and its impact on women in India); national and international policies	4	
Part C. Contemporary Issues in Developing Countries		4	2
12	<u>Recent policies related to women</u> ; Rise of ethnicity and its impact on gender and population variables; changing aspects of social stratification and gender; case studies		
Total		34	8

The course is reviewed and commented by the following experts.

Prof. Vinay Kumar Srivastava
Professor of Social Anthropology
 Department of Anthropology
 University of Delhi

Dr. Avanish Kumar
 Associate Professor
 Management Development Institute
 Gurgaon.

Suggested readings:

1. Asoka Bandarage (1997) *Women, Population and Global Crisis: A Political-Economic Analysis*. (London & New Jersey: Zed Books). (ISBN: 1-85649-428-4)
2. Oswaldo de Rivero (2001). *The Myth of Development*. (Halifax: Fernwood Publishing)
3. Visvanathan, Nalini, et al (eds) (1997) *The Women, Gender and Development Reader: Writings on Gender and Development*. London: Zed.

4. Brydon, Lynne and Chant, Sylvia (1993) *Women in the Third World*. Aldershot: Edward Elgar (reprinted edition).
5. Elson, D. (ed) (1995) *Male Bias in the Development Process*. Manchester University Press
6. Agarwal, Bina (1995). *A Field of One's Own: Gender and Land Rights in South Asia* (Cambridge South Asian Studies) New York: Cambridge University Press.
7. Sriya Iyer (2002) *Demography and Religion in India*. OUP.
8. Sarkar, Siddharthasss (2007). *Gender, Work and Poverty*. Eastern book corporation
9. Subhasini Mahapatra (2002). *Women Participation in Labour Force*. New Delhi: Rajat.
10. Arup Maharatna. *Demographic perspectives on Indian Tribes*. OUP
11. W Lutz, 1994. *The Future Population of the World*. London: Earthscan
12. Agnihotri, SB. 2000. *Sex Ratio Patterns in the Indian Population: A Fresh Exploration*. Sage Publications: New Delhi
13. Miller, Barbara D. 1981. *The Endangered Sex: Neglect of Female Children in Rural North India*. Ithaca: Cornell University Press
14. John Knodel, Rossarin Soottipong Gray, Porntip Sriwatcharin, Sara Peracca. (1999) "Religion and Reproduction: Muslims in Buddhist Thailand" in *Population Studies* volume 53 number 2
15. Simon Gregson; Tom Zhuwau; Roy M. Anderson; Stephen K. Chandiwana (1999) "Apostles and Zionists: The influence of religion on demographic change in rural Zimbabwe" in *Population Studies* volume 53 number 2
14. **Mortality, Fertility, and Gender Bias in India: A District-Level Analysis** Mamta Murthi; Anne-Catherine Guio; Jean Dreze
Population and Development Review, Vol. 21, No. 4. (Dec., 1995), pp. 745-782.
15. **Expectations, Gender, and Norms in Migration Decision-Making**
Gordon F. De Jong
Population Studies, Vol. 54, No. 3. (Nov., 2000), pp. 307-319.
16. **Gender and Aging in the Developing World: Where Are the Men?**
John Knodel; Mary Beth Ofstedal
Population and Development Review, Vol. 29, No. 4. (Dec., 2003), pp. 677-698.
17. **Gender Inequality and Fertility in Two Nepali Villages**
S. Philip Morgan; Bhanu B. Niraula
Population and Development Review, Vol. 21, No. 3. (Sep., 1995), pp. 541-561.
18. **On Kinship Structure, Female Autonomy, and Demographic Behavior in India**
Tim Dyson; Mick Moore
Population and Development Review, Vol. 9, No. 1. (Mar., 1983), pp. 35-60.
19. **Muslim and Non-Muslim Differences in Female Autonomy and Fertility: Evidence from Four Asian Countries**
S. Philip Morgan; Sharon Stash; Herbert L. Smith; Karen Oppenheim Mason
Population and Development Review, Vol. 28, No. 3. (Sep., 2002), pp. 515-537.
20. **Fertility Decline and Increasing Gender Imbalance in India, Including a Possible South Indian Turnaround**
Alaka Malwade Basu
Development and Change, Volume 30, Issue 2: 237-263.

Course No.
 Course title: **Public Health and Sustainable Development**
 Number of credits: 3 (1-2-0)
 Number of lectures-tutorials: 16-26-0
 Course coordinator(s): Atanu Sarkar, Nitish Dogra and Jyotsna Bapat

Course outline:

The rationale for the course *Public Health and Sustainable Development* is to boost knowledge and skills of public policy mid-career professionals enabling them to forge effective linkages between health and development. Public health in the context of sustainable development is an integral part of health and the UN millennium development goals. However few programmes in the field of public health address this vital aspect of development as a stand-alone issue. The curriculum is envisaged as a novel academic initiative based in the “real world”. Faculty of the TERI University would impart the degree in a synergized effort between an in-house core team and outside experts.

Evaluation procedure

- Class discussion : 20%
- Tutorials/assignment : 30%
- 2 Minor tests : 20%
- 1 Major test : 30%

Details of course contents and allotted time

Module	Topic	Allotted time (hours)	
		Lectures	Tutorials
	Introduction to public health and sustainable development <ul style="list-style-type: none"> • <i>Public health and sustainable development – exploring linkages</i> 	1	
1	Epidemiology & Evidence based public health <ul style="list-style-type: none"> • <i>Epidemiology and its uses in public health policy</i> 	1	1
2	Health policy, finances and services <ul style="list-style-type: none"> • <i>National health policy and services</i> • <i>Improving efficiency in health financing</i> 	2	1
3	Public health and sustainable development I: Health promotion <ul style="list-style-type: none"> • <i>Concept of health promotion for sustainable development</i> 	1	2
	Health legislation <ul style="list-style-type: none"> • <i>Public health laws, acts and regulation, enforcement</i> 	1	2

	Rehabilitation <ul style="list-style-type: none"> • <i>Impairment, disability and handicap</i> 	1	2
	Food security & nutrition <ul style="list-style-type: none"> • <i>Food security: concepts & management in national & international contexts</i> • <i>Malnutrition & Integrated Child Development Scheme (ICDS)</i> • <i>Obesity and lifestyle diseases</i> 	3	6
4	Public health and sustainable development II: Health, environment and sustainable science linkages <ul style="list-style-type: none"> • <i>Environmental and occupational health</i> • <i>Psychosocial environment</i> • <i>Essential health infrastructure, technology and drugs</i> • <i>Inter-sector issues in health</i> 	4	8
5	Leadership, ethics and human rights in public health <ul style="list-style-type: none"> • <i>Leadership and crisis management</i> • <i>Ethics and human rights in health</i> 	2	4
	Total	16	26

The course is reviewed and commented by the following experts.

Dr Uma Chawla
Professor
National Institute of Communicable Diseases
New Delhi

Dr Madhumita Dobe
Professor
All India Institute of Hygiene and Public Health
Kolkata

Suggested readings

1. National rural health mission, Framework for implementation 2005 – 2012, Ministry of Health and Family Welfare. GOI
2. Central Bureau of health intelligence (CBHI) report (1998 – 2005).
3. National nutrition Monitoring Bureau Report
4. Planning Commission, India Assessment 2002, Water Supply and Sanitation, A WHO- Unicef Study, New Delhi: Planning Commission.
5. Park K, Text book of Preventive and Social Medicine, Banarasi Das Bhanot, Jabalpur.
6. Stephen P Luby et al 2005, Effects of handwashing on child health: a randomised controlled trial, The Lancet, Vol 366, pp 225 – 233.

7. National Commission on Macroeconomics and Health (2005). Background Documents and Report. Government in India, Ministry of Health & Family Welfare, N Delhi.
8. Rajiv Misra, Chakroborty R and Sujata Tao. India Health Report (2003). Oxford Publications.
9. Atanu Sarkar, Srikanta Panigrahi. (2007) Water borne diseases in India – environmental health and policy perspectives, Manak Publications, New Delhi.
10. Atanu Sarkar, Srikanta Panigrahi and Mona Anand. (2007) Vector borne diseases in India – environmental health and policy perspectives, Manak Publications, New Delhi.
11. Brownson Ross, Baker Elizabeth, Leet Terry, Gillespie Kathleen, (2003) Evidence based public health, OUP, New York.

Course No.	
Course Title:	Social security and development
Number of Credits:	3 (2.5-0.5-0)
Number of Lectures-Tutorials-Practical:	34-8-0
Course coordinator:	Dr Mala Narang Reddy

Course Outline

The course is designed to give students an understanding of social security in relation to the field of development and explore its application in various cases and regions of the world. The course will generate knowledge on (1) the nature of social security in Indian and international context (2) various parameters of social security (3) issues and debates on extending social security to the informal sector in developing countries (4) the need for new model for provision of social security.

Part A covers the concept, definitions, evolution and need for social security in detail. Part B includes a study of the various issues involved in social security, such as employment, gender equality and financing of social security. It also discusses the challenges to expansion of social security in developing countries, social security as a human right and rights-based approach to social security in India. The last section deals with policy and practice in the Indian context, which takes the students through some important case studies.

The class will be based on readings, discussions and case studies and the knowledge generated will help students critically analyze how social security/protection measures need to be made more effective and all-encompassing in India.

Evaluation Procedure (% of aggregate marks):

- Review (1000 words) : 15%
- 2 minor tests : 40%
- 1 major test (end semester) : 45%

Details of course content & allotted time

S.No	Topic	Allotted time (hours)	
		Lectures	Tutorial/ Class Discussion
Part A. Introduction to the Concept of Social Security		6	
1	Social security – concept and its relation with social policy; functions and indispensability of social security	2	
2	<ul style="list-style-type: none"> • Evolution of social security – social security in ancient and medieval societies; social security and industrialized societies • Social security in developed world • Role of informal institutions (family, peer group, neighbourhood) in providing social security 	2	
3	<ul style="list-style-type: none"> • Basic social security and contingent social security • Purpose and contingencies of social security as per International Labour Organization 	2	
Part B. Social Security: Issues, challenges and prospects		8	
5	<ul style="list-style-type: none"> • Social security, employment and development • Extending personal coverage of social protection • Gender equality • The financing of social security • Strengthening and expanding social dialogue 		
Part C. Challenges to Social Security in Developing Countries		8	2
10	<ul style="list-style-type: none"> • Expansion of the Concept and Coverage of Social Security in a Globalizing World • Evolution of social security in developing countries • Impact of globalization – growth of informal economy; threat to social security (Asian financial crisis) • HIV/AIDS pandemic in Africa • Debate on social security as a human right • Alternate models to the extension of social security 		
Part D. Social protection: Implications for policy and practice In Indian context		12	6
11	<ul style="list-style-type: none"> • Rights-based approach to social security in India; provisions contained in the Indian constitution; social security plans in India (education, health insurance, retirement, etc.) • Case study of Kerala model of development (Welfare Fund Model); state policy favouring land reforms, labour rights, social development and social security • Social security challenges in India – social security for differential strata of society (gender, age, marginal communities); Terrorism/violence/social discrimination; issues of social security for victims of disasters • Age, ageing and gender; demographic trends; definition of old age; retirement problems; physical effects of ageing; ageism; social security in old age • Action and policy – development agency and government structures; review of policy approaches; social protection and the state; future directions and strategic priorities; governance, social protection and the development process 		
Total		34	8

The course is reviewed and commented by the following experts.

Prof. Vinay Kumar Srivastava
Professor of Social Anthropology
Department of Anthropology
University of Delhi

Dr. Avanish Kumar
Associate Professor
Management Development Institute
Gurgaon.

Suggested readings

1. Ahmad, Jean Dreze, John Hills and Amartya Sen (eds.) 1991. *Social Security in Developing Countries*. New Delhi: OUP.
2. Datta, R.C. 1998. "Public Action, Social Security and Unorganised Sector", in *Economic and Political Weekly*, 33(22).
3. Kannan, K.P. 2004. "Social Security, Poverty Reduction and Development: Arguments for Enlarging the Concept of Social Security in a Globalizing World." ILO, Extension of Social Security Papers:21, Geneva.
4. Andy Norton, Tim Conway, Mick Foster. 2001. "*Social Protection Concepts and Approaches: Implication for policy and practice in international development.*" Working Paper 143. Overseas Development Institute .
5. Rao, P. Madhava. "Social security for the unorganized in India – An approach paper"
6. Krishnamurthy, V. and Nair. R. P. 2003. "The Welfare Fund for Construction Workers in Tamil Nadu". ESS paper. International Labour Office. Geneva.
7. Sarah Cook, Naila Kabeer and Gary Suwannarat. 2003. *Social Protection in Asia* Har-Anand: New Delhi
8. John van Willigen and Narender K. Chadha. 1999. *Social Aging In A Delhi Neighborhood*. Bergin and Garvey: Westport, Connecticut and London.
9. Sarah Cook, Naila Kabeer and Gary Suwannara. Social Protection in Asia
10. Vinay Kumar Srivastava, 'Ageism' http://www.india-seminar.com/2000/488/488_srivastava.htm • Monday, 25 June 2001, 5:06pm GMT • 31.9k
11. Mirai Chatterjee, 'Social security through health insurance' http://www.india-seminar.com/2004/541/541_mirai_chatterjee.htm • Tuesday, 31 August 2004, 5:34pm GMT • 33.4k

Course No.	
Course Title:	Transportation Infrastructure: Policy, Planning and Regulation
Number of credits:	3 (2-1-0)
No. of Lectures – tutorial – practical:	29-6-7
Course coordinator:	O.P. Agarwal

Course Outline

Good transportation is becoming increasingly important for the overall economic development of nations. Developing countries are feeling the need to enhance investments in transportation infrastructure in order to secure their competitiveness in a globalizing world. Transportation costs are an important component in maintaining such competitiveness. Delays in meeting the transportation needs add to costs and therefore, it is not just the financial costs but also the quality of transportation services that is important. Apart from this, transportation provides access to jobs, education and other social needs in an urban setting. Rapid urbanization and the associated increases in travel demand have led to congestion and other health hazards. Investments in transport infrastructure are high and therefore need to be properly evaluated so that the money spent leads to the best results. However, this requires an understanding of the complexities of demand for transportation services, the most optimal systems of transportation for any requirement and systems for the proper management and regulation of transportation systems.

The objective of this course is to meet the above requirements and enable the participants of the program to understand the features and unique characteristics of different modes of transport, the qualities expected in a good transport system, make a professional evaluation of proposals for such investments and develop a vision for transport requirements in the short, medium and long term.

Evaluation procedure

Assignments (2):	30 % (15 × 2)
Practical field study	15%
Mid term test	20%
Final, end semester test:	35%

Details of course content and allotted time

The details of the topics to be covered in the course are the following:

Topic	Time allotted (hours)		
	Lectures	Tutorial	Practical
Role of transportation in the economic development of nations, overview of transport modes, growth	1		

Topic	Time allotted (hours)		
	Lectures	Tutorial	Practical
trends, National Transport Policy of India, 1980, etc			
Road based systems: main challenges, policy issues, regulatory issues, investment trends and needs	1		
Road based systems: environment for privatization and competition, future directions for the Indian roads sector, global experience in privatization of highways	1		
Rail based systems: main challenges, policy issues, regulatory issues, investment trends	1		
Rail based systems: future directions of the Indian Railways	1		
Shipping: main challenges, policy issues, regulatory issues, investment trends	1		
Shipping: future directions for the shipping industry in India	1		
Ports: main challenges, policy issues, regulatory issues, investment trends, future directions	1		
Inland water transport and coastal shipping: main challenges, policy issues, regulatory issues, investment trends, evolution and future directions in India	1		
Urban transport: main challenges, policy issues, regulatory issues, investment trends, future directions in India	2		1
Analytical methods for transportation: survey techniques, design of survey questionnaires, sampling and sample size determination	2	0	1
Analytical methods for transportation: demand estimation, discrete choice	1	1	
Analytical methods for transportation: costing – fixed costs, variable costs, marginal costs, pricing techniques	1	1	2
Analytical methods for transportation: Rate of return analysis	2	2	2
Planning for sustainable urban mobility, positive and negative externalities in urban transport, congestion pricing, parking policy, demand management, etc	2	1	
Importance of urban public transport and technologies for public transport, comparison of Bus Rapid Transit and Metro Rail	2	1	
Design issues in urban public transport	2		1
Planning for non-motorized transport	1		
Transportation as a tool for shaping land use in urban areas	1		
Regulatory and governance issues in urban public	2		

Topic	Time allotted (hours)		
	Lectures	Tutorial	Practical
transport			
Public Private Partnerships in transport	2		
Total	29	6	7

The course is reviewed and commented by the following expert.

Prof Ralph Gakenheimer
MIT, Boston, USA

Suggested readings

1. Association of State Road Transport Undertakings, 1988. *State Transport Undertakings: Profile and Performance, 1997-98*. New Delhi.
2. Estache, A., Gomez-Lobo, A., 2005. *Limits to Competition in Urban Bus Services in Developing Countries*. *Transport Reviews*. 25(2) 139-158.
3. Estache, A., Gonzalez, M., Trujillo, A., 2002. *What Does Privatization Do for Efficiency? Evidence from Argentina's and Brazil's Railways*. *World Development*. 30(11). 1885-1897.
4. Gomez-Ibanez, J.A. & Meyer, J.R., 1997. *Alternatives for Urban Bus Services: An International Perspective on the British Reforms*. *Transport Reviews*, 17(1), 17-29
5. Guislaam, P. Kerf, M., 1995. *Concessions – The Way to Privatize Infrastructure Sector Monopolies*. Private Sector. 59. The World Bank
6. Gwilliam, K and Scurfield, R, 1996. *Competition in Public Road passenger Transport*. TWU-24. World Bank, Washington, DC
7. Gwilliam, K., 2002. *Cities on the Move*. Urban transport strategy review. World Bank, Washington DC.
8. Kapoor, A., 2001. *Regulatory Processes & Decision Making*. In: Sarkar, S.K., Deb, K., (Eds) *Regulation of Infrastructure Services*, TERI, New Delhi.
9. Kenworthy, J., 2002. *Traffic 2042 – A More Global Perspective*. *Transport Policy*. 9. 11 – 15.
10. Mackie, P., Preston J. & Nash, C., 1995. *Bus Deregulation: Ten Years On*. *Transport Reviews*, 15(3), 229-251
11. Meyer J & Gomez-Ibanez, J. A., 1991. *Transit Bus Privatization and Deregulation Around the World: Some Perspectives and Lessons*. *International Journal of Transport Economics*, 18(3), 231-258

12. Meyer M. and Miller E., *Urban Transport Planning*.
13. Ministry of Surface Transport, 1999. *Handbook of Transport Statistics in India*
14. Ministry of Surface Transport, 2003. *Motor Transport Statistics in India*
15. Ministry of Urban Development, 2006. *National Urban Transport Policy*
16. Mody, A., 1995. *Infrastructure Delivery: Private Initiative and Public Good*. The World Bank. Washington DC.
17. Pearce D. & Turner R., 1990. *Economics of Natural Resource Management & the Environment*; John Hopkins University Press
18. Planning Commission of India, 2007. *Approach Paper to the 11th five year plan*.
19. Planning Commission of India, 1980. *National Transport Policy*
20. Pucher, J., Korattyswaroopam, N., Ittyerah, N., 2004. *The Crisis of Public Transport in India: Overwhelming needs but Limited resources*. Journal of Public Transport. 7(4)
21. RITES, 1988. *Traffic and Transportation Policies and Strategies in Urban Areas in India*. Report submitted to the Government of India, Ministry of Urban Development, New Delhi.
22. Sarkar, S.K. and Deb, K. 2001. *Regulation in Infrastructure Services: Progress and the way forward*. TERI, New Delhi
23. Shoji, K., 2001. *Lessons from Japanese Experience of Roles of Public and Private Sectors in Urban Transport*, Japan Railway and Transport Review. 29: 12-18.
24. World Bank. 1995. *Indian Transport Sector: Long Term Issues*.
25. World Bank, 1997. *World Development Report*.
26. World Bank, 2000. *World Development Indicators*

Course No.
 Course Title: **Management Information Systems**
 Number of credits: 3
 No. of Lectures – tutorial – practical: 42-0-0
 Course coordinator: Dr. Umesh Gulla

Course outline:

The objective of this course is to introduce the students to the Management Information Systems and to expose the students to the managerial issues relating to information systems and help them identify and evaluate various options in Information Systems.

Evaluation Procedure

- End term exam: 50%
- Presentation on any course Topic: 10%
- Minor Project: 15%
- Internal Tests: 15%
- Case Submission: 10%

Details of course contents and allotted time

Sr. no.	Topic	Time allotted (hours)		
		Lectures	Tutorial	Practical
1.	Meaning and Role of Information Systems. Types of Information Systems: Operations Support Systems, Management Support Systems, Expert Systems, and Knowledge Management Systems. Information Systems for Strategic Management: Competitive Strategy Concepts, Strategic Role of Information Systems. Integrating Information Systems with Business Strategy, Value Chain Analysis, and Strategic Information Systems Framework.	10		
2.	Planning for Information Systems: System Development Process, Identification of Applications, Business Planning Systems and Critical Success Factors, Method of Identifying Applications, Evaluation of Information Systems. Risks in Information Systems. Resource Requirements for Information Systems: Hardware and Capacity Planning, Software Needs, Procurement Options – Make or Buy decisions, Outsourcing as an Option.	10		

Sr. no.	Topic	Time allotted (hours)		
		Lectures	Tutorial	Practical
3.	Emerging Concepts and Issues in Information Systems: Enterprise Resource Planning, Supply Chain Management, Customer Relationship Management, Introduction to Data Warehousing, Data Mining and its Applications.	10		
4.	<p>Minor Project in MIS:</p> <p>Each student will do a minor project in any organization on a specific Information System related issue of their choice. This project may include the following:</p> <ul style="list-style-type: none"> • Historic Development of the industry & MIS • Examination of Current Issues • Study of the particular MIS, its functionalities, its impact on the organization, reason(s) for adoption of the MIS, the student's recommendations and future directions in that MIS domain. • References 	12		

The course is reviewed and commented by the following experts.

Mr. Gyan Prakash,
Faculty Member
School of Management Sciences
Tezpur University, Tezpur

Prof. H.K. Mishra
Professor
Institute of Rural Management
Anand

Text Books:

1. Kenneth, Laudon and Jane Laudon (2005). MIS: Managing the Digital Firm. Pearson Education.
2. James, A. O'Brien (2005). Introduction to Information Systems. Tata McGraw Hill.

Suggested readings

1. Turban, E., McLean, E. and Wetherbe, J. (2001). Information Technology for Management: Making Connections for Strategic Advantage. John Wiley and Sons.
2. Jawadekar, W. S. (2004). Management Information Systems. Tata McGraw Hill.

Course No.:

Course title:

**Issues in local Government administration
(including decentralized development and local
governance)**

Number of credits:

3

Number of lectures-tutorial practicals:

34-0-9

Course Coordinator:

Jeevan P Mohanty

Course outline

The course gives an in depth understanding of the decentralization process in India. It examines local administration from a politico-economic, sociological and environmental framework. Along with familiarizing the participants about the important issues at stake, it teaches them to think in the realm of present challenges and find their solutions. This course intends to expose the participants to the emerging problems and prepares them to look beyond the underlying regulations and practices for attaining a just and equitable development.

Course Structure

The course is divided into four parts (1) Scope and Significance of Local Government in India (2) Administrative, Planning, Financial, and other Emerging Issues in Rural Governance (3) Urban Local Governance: Administrative, Planning and Financial Issues (4) Urban and Rural Local Bodies: Problems and Perspectives. The course intends to highlight the nature and significance of each issue and also discusses the remedies and alternatives. It would help administrators discovering an alternative approach to development.

Evaluation Procedure

Assignment and Presentation:	20%
Minor Tests (2 of 20% each):	40%
Final Examination	40%

Details of course content and allocated time

Sr No.	Topic	Time allotted (hours)		
		Lecture	Tutorial	Practicals
A	Scope and Significance of Local Government in India	3		1
	Theories and Practices in Local Bodies in India Theories of federalism, political economy of federal governance, Theories of fiscal decentralization Context of rural and urban local bodies Principles determining the functional responsibilities of local governments Principle of subsidiarity Question of autonomy vs dependency Comparative analysis of local governance Post constitutional amendment phase: An impact analysis			
B	Administrative, Planning, Financial and other Emerging Issues in Rural Governance	14		3
1	Service Delivery, Development Schemes and Administrative Responsibility Traits of a responsive administration and service delivery mechanisms Alternative service Delivery mechanisms Public private community partnerships (PPCP) – Case study Administrative accountability and transparency Analysis and examination of major development schemes Social audit at panchayat level – Case study Outlining a new role for district administration Voluntary organizations and local development	4		1
2	Decentralized Local Level Planning and Public Participation Context of decentralized planning Gram Sabha in local planning Incorporating sectoral needs in village development plan	4		1

	<p>Aspects of district planning and district development plan</p> <p>District planning committees (DPCs)</p> <p>DPCs and 73rd amendment – A case study of Kerala</p> <p>Features and prospects of DISNIC plan</p>			
3	<p>Augmenting Panchayat Finance and Financial Management of Schemes</p> <p>What are local public services – Need for keeping them as part of local provision</p> <p>Changing character of local public services</p> <p>Identification and assessment of panchayat revenue sources – Case study of West Bengal</p> <p>Approaches to budgetary control and financial management of schemes in panchayats</p> <p>12th Finance Commission and prescriptions for revenue mobilization in panchayats</p> <p>Legislative scrutiny of panchayat finances</p> <p>Capacity building for better fund management in panchayats</p>	3		1
4	<p>Emerging Issues in Panchayat Governance</p> <p>Human development and panchayats</p> <p>Co-operatives and community development</p> <p>SHGs and CBOs in micro level development</p> <p>Microfinance and village level development</p> <p>Challenge of integrating rural poor into market</p> <p>Disaster management and panchayat involvement</p> <p>Law and order in panchayats – Community policing</p> <p>People – police partnership to fight internal insurgency – Case study of Chhatisgarh</p>	3		
C	<p>Urban Local Governance, Administrative, Planning and Financial Issues</p>	14		3

1	<p>Governing Urban Local Bodies Perspectives in urban local governance Changing management pattern in urban service delivery Role of communities (RWAs) in management of civic services Migration Issues Managing slums – ensuring housing for urban poor (Case study of mega cities) Pro-poor governance of schemes Evaluation and analysis of JNNURM and SJSRY Performance management and capacity building in urban local bodies The future of urbanization</p>	4		1
2	<p>Planning Imperatives in Urban Local Bodies Morphological and structural aspects of urban planning Growth pattern of cities and urban land use Public participation and plan implementation Planning and managing urban transport system Disaster management plan – Incident command system GIS based urban planning Peri-urban planning – Discussion on Delhi Master Plan - 2021</p>	6		1
3	<p>Management of Urban Local Finances Urban finance and sustainability Principles determining the tax and revenue raising powers of urban local government Organizational coordination and effective service delivery in urban bodies Streamlining service delivery Staff autonomy and fiscal issues Urban infrastructure development – financing issues (Case study of Delhi Metro)</p>	4		1
D	<p>Urban and Rural Local Bodies – Issues in Perspective</p>	3		1

Local development, decision making and decision makers Ecological dimensions of development administration Integrated delivery system for social services Evaluation mechanism for anti-poverty programmes Development and climate change: approaches for eco-societies ICT and E-Governance G to C, B to G and G to G relationships			
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The course is reviewed and commented by the following experts.

Prof. Vinod Sharma
Professor
IIPA, New Delhi

Prof. O.P.Mathur
Professor
NIPFP, New Delhi

Suggested readings

1. Cernea, Michael M., Putting People First: Sociological Variables in Rural Development, IBRD, Washington D.C., 1991
2. Attwood, D.W. and Baviskar, B.S., Who Shares? Co-operatives and Rural Development, OUP, Delhi, 1988
3. Clocke, Paul J and Park Chris C., Rural Resource Management, Crown Helm, 1985
4. Hondale, George, Integrated Rural Development: Making it Work? Organization and Administration in Integrated Rural Development,
5. Brown, David W., Rural Development Agencies and Decision Makers, University of Tennessee Press, Knoxville
6. Civil Society and Local Governance, EROPA Local Governance Centre, Quezon City, 2006
7. Palanithurai, G., Dynamics of New Panchayati Raj System in India, Concept Publishing House, New Delhi, 2004
8. Chakravarty, Vidyut and Bhattacharya, Mohit, (Ed.) Administrative Change and Innovation: A Reader, 2005
9. Bhattacharya, Mohit and Dutta, Prabhat, Anti Poverty Programme Evaluation
10. Bhattacharya, Mohit, Essays in Urban Government
11. Jagannadham, V. and Bhattacharya, Mohit, Integrated Delivery System for Social Services, 1977

12. Bhattacharya, Mohit, Management of Rural Development, 1989
13. Thomas Issac, T.M. and Franke, Richard W., Local Democracy and Development: People's Campaign for Decentralized Planning, Leftword, 2000
14. Oommen, M.A and Dutta, Abhijit, Panchayats and their Finance, Institute of Social Sciences, New Delhi, 1995
15. Malcom, S. Adishesiah, et.al, Decentralized Planning and Panchayati Raj: Proceedings of the D.T.Lakdawala Memorial Symposium, 1994
16. Faisal, S.A. and Al Salem, The Ecological Dimension of Development Administration with Particular Reference to the Social System: Environment of Administrative System in Low Income Countries,
17. Korten, David C. and Alfonso, Felipe B. (Ed.), Bureaucracy and the Poor: Closing the Gap, 1981
18. Riggs, F.W. and Krishna, D., Development Debate, 1987
19. Kumar, Bhuwan and Singh, R.B., Urban Development and Anthropogenic Climate Change: Experience in Indian Metropolitan Cities, Mrak Publishers, 2003
20. Thakur, B et.al, Urban and Regional Development in India: Essays in Honour of Prof. L.N.Ram, Concept Publishing House, New Delhi, 2005
21. Inoguchi, Takashi and Newman, Edward and Paoletto, Glen (Ed.), Cities and the Environment: New Approaches for Eco-societies, 1999
22. Jones, Sue and Nelson, Nici (Ed.), Practitioners and Poverty Alleviation: Influence of Urban Policy from the Ground Up, ITDG, 2005
23. Singh, B.D., Planning for Rural Development and Poverty Alleviation, Mittal Publications, New Delhi, 1992
24. Begum, S. Mehartaj, District police Administration: A Case Study, Anmol Publications, New Delhi, 1996
25. Mohanty, Manoranjan, Baum, Richard, Ma, Rong and Mathew, George (Ed), Grassroots Democracy in India and China: The Right to Participate, Sage Publications, New Delhi,
26. Chang, Claude V., Privatization and Development: Theory, policy and Evidence, Ashgate Publications, 2006
27. Barthwal, C.P. (Ed.), Good Governance in India, 2003
28. Bhattacharya, B., Urban Development in India Since Pre-Historic Times, Concept Publishing House, New Delhi, 2006
29. Kumar, Girish, Local Democracy in India: Interpreting Decentralization, Sage Publications, New Delhi, 2006
30. Agarwal, U.C., (Ed.) Public Administration: Vision and Reality, IIPA, New Delhi, 2004
31. Varshney, Ashutosh, Democracy, Development and the Countryside: Urban Rural Struggle in India, Cambridge University Press, Cambridge, 1995
32. Rogers, Steve, Management of Urban Local Finances: Performance Management in Local Government, London, 1999
33. Sivaramkrishnan, K.C., et.al, The Future of Urbanization, Spread and Shape in Selected Cities, Centre for Policy Research, New Delhi, 2001
34. Ghosh, Archana and Lama-Rewal, Stepahnie Tawa, Democratization in Progress: Women and Local Politics in Urban India, Tulika Books, New Delhi, 2005
35. Singh, U.B, Urban Local Government, Rawat Publications, New Delhi 1997
36. Sharma, Pankaj, E- Governance, APH Publishing Corporation, New Delhi, 2004

37. Gupta, M.P., *Tworads E-Government: Management Challenges*, TMH Publishing Company, New Delhi, 2004
38. Gupta, M.P., *Promise of E- Governance: Operational Challenges*, TMH Publishing Company, New Delhi, 2004
39. Debroy, Bibek and Kaushik, P.D.(Ed.), *Energizing Rural Development through Panchayats*, Academic Foundation, New Delhi, 2005
40. Pratchett, Lawrence and Wilson, David (Ed.), *Local Democracy and Local Government*, McMillan Press Ltd., Hongkong, 1996
41. Godbole, Madhav, *Public Accountability and Transparency: The Imperatives of Good Governance*, Orient Longman, New Delhi, 2003
42. Hulme, David, Turner, Mark.M., *Governance, Administration and Development: Making the State Work*, Kumarian Press, 1997

Occasional and working papers

1. Mukarji, Nirmal, et.al, *People's Representatives and Bureaucracy, the Interface in Panchayati Raj*, (ISS Occasional Paper Series 17) Institute of Social Sciences, New Delhi, 1995
2. Vera, Roberto de and Kim, Yun-Hwan, *Local Government Finance, Private Sources and Local Credit Markets in Asia*, (ERD Working Paper Series No. 46), Asian Development Bank, Manila, 2003
3. Bilsborrow, Richard E, *Rural Poverty, Migration and Environment in Developing Countries: Three Case Studies*, (Working Papers 1071), IBRD, Washington D.C., 1992

Course No.:	
Course title:	Oil & Gas Business
Number of credits:	3
Number of lectures-tutorial/case studies practicals:	36-6-0
Course coordinator:	Ms Ruchika Chawla

Course outline

This course would cover the basics of oil and gas business. This would include basics of Exploration & Production, Refining, Marketing and Natural Gas. In addition, it would cover important aspects of oil and gas business such as pricing, international trading, risk management, storage and transportation, petroleum laws, liberalization, regulatory framework, emerging trends, challenges and outlook for petroleum industry.

Evaluation procedure

- Case Study: 15%
- Class room Participation: 35%
- Final Exam: 50%

Details of course content & allotted time

No	Topics	Allotted time (hours)		
		Lectures	Tutorials/ Case studies	Practicals
1.	Historical perspective of Petroleum Industry in India and overview of Global Petroleum Industry	3		
2.	Basics of: <ul style="list-style-type: none"> ▪ Exploration & Production including special features of accounting and asset management ▪ Refining including linkage to Petrochemicals ▪ Marketing including Aviation/Marine/Lubes & Greases sales and MS/HSD retailing 	2 2 2		
3.	Pricing of Crude Oil and Petroleum Products including taxation and subsidies in India	2		
4.	International trading of Crude Oil/ Petroleum Products and Risk Management	3		

No	Topics	Allotted time (hours)		
		Lectures	Tutorials/ Case studies	Practicals
5.	Storage and Transportation of Crude Oil and Petroleum Products	2		
6.	Petroleum Laws	3		
7.	Linkage between International and Domestic developments	2		
8	Liberalization and Globalization of Petroleum Industry in India: <ul style="list-style-type: none"> ▪ E & P Sector ▪ Refining Sector ▪ Marketing Sector 	3		
9	Natural Gas – Basics, Pricing, International Trading, Storage and Transportation, Liberalisation and Globalisation	6	6	
10	Regulatory Framework in India: <ul style="list-style-type: none"> ▪ Upstream ▪ Downstream Petroleum & Natural Gas 	3		
11	Emerging Trends, Challenges, Thrust Areas and Outlook for Petroleum Industry in India	3		
	Total	36	6	

Field Visits:

Field visits to Refinery, Petrol/Diesel Retail Outlet and CNG Outlet shall be planned

The course is reviewed and commented by the following experts.

Dr. N G Kanan
Former Director (Marketing)
Indian Oil Corporation

Mr. Prabir Sengupta
Distinguished Fellow
TERI

Suggested readings

1. Petroleum Statistics by Ministry of Petroleum & Natural Gas
2. BP Statistical Review
3. Oil and Gas Exploration and Production : Coordinated by Centre for Economics and Management (IFP- School)
4. Petroleum Refinery Process Economics by Robert E. Maples (PennWell Publication)
5. Downstream India (History of Downstream Petroleum Industry) :
Chief Editor- Mr B.K. Bakhshi
6. Laws of the Ministry of Petroleum and natural gas, Government of India

Course No.:	PPM 113
Course title:	Operations Research
Number of credits:	3-1-0
Number of lectures-tutorial practicals:	37-19-0
Course Coordinator:	Dr Puneet Chitkara

Course outline

The course is designed to help the students:

- Formulate optimization problems from real world observations and use optimization techniques to solve these problems.
- To use the solutions of the optimization problems to infer the impact of strategic variables on the management and policy outcomes.
- Develop an appreciation of the sophistication required for modeling various market processes in the light of liberalization, de (re) – regulation and globalization
- Use optimization techniques to analyze markets and trade
- Understand the mathematical underpinnings of these techniques

Evaluation Procedure

- 2 Assignments: 40%
- 2 Minor Tests: 20%
- Major Examination: 40%

Details of course content and allotted time

S. No.	Topics	Time allotted (hours)		
		Lectures	Tutorials	Practicals
1	Fundamentals of Matrix Algebra	8	4	
	Scalars, Vectors and Matrices	1		
	Operations on Matrices	1		
	Linear Dependence and Independence	1		
	Vector Spaces	1		
	Linear Transformations	0.5		
	Eigenvalues and Eigenvectors	1		
	Linear Equations	1		
	Vector and Matrix Norms	1		
	Condition Numbers	0.5		
	Problem Solving		4	
		Linear Optimization		
2	Solution of Equations, Inequalities and Linear Programs	10	5	
	Extreme Values, Relative Maximum and Minimum	1		
	Concave and Convex Functions	1		
	Solution of Linear Equation Systems	1		

S. No.	Topics	Time allotted (hours)		
		Lectures	Tutorials	Practicals
	Linear Optimization Problems	1		
	Linear Programs and Convex Sets	1		
	Linear Programs	1		
	Illustration of a Simplex Method	2		
	Solution of Linear Programs (GAMS)		1	
	Duality in Linear Programs	2		
	Problem Solving		4	
	Nonlinear Optimization			
3	Mathematical Background to Nonlinear Programs	6	2	
	Form of Nonlinear Optimization Problem			
	Preliminaries: The Gradient, Differential of a Function, The Jacobian Matrix, The Hessian Matrix, Directional Second Derivative	2		
	Taylor Series Expansion of Functions	2		
	Extreme Points of Multivariate Functions	1		
	Quadratic Functions	1		
	Solved Examples		2	
4	Unconstrained Nonlinear Optimization	3		
5	Constrained Nonlinear Optimization	10	2	
	Effect of Constraints on the Solution Space	2		
	Karush-Kuhn-Tucker Conditions	2		
	Interpretation of Lagrange Multipliers	2		
	Testing KKT Conditions	2		
	Nature of Solution of Nonlinear Programs	2		
	Examples		2	
6	Nonlinear Optimization Problems		6	
	Transmission Voltage Optimization		2	
	Coal Mining Strategy		2	
	Power System Dispatch		2	
	TOTAL	37	19	

Assignment 1: Linear Program Problems (Weightage: 20%)

The students will be required to submit assignments on the following topics. The assignments will be given in the class to a group of students (each group not more than 4). The students will be required to make a presentation on problem formulation and submit the program used to solve the problems.

- Optimal Mixing
- Dispatch Problem
- Simple Auction

- Dispatch Problem with Demand Bids
- Tradeoff Between Cost of Emissions and Cost of Dispatch
- Transportation Problems: Warehouse Distribution Problem and Integrating Natural Gas Transportation and Electricity Generation
- Reservoir Management

Minor Test 1 will be conducted on the completion of Chapters 1 and 2. (**Weightage: 10%**)

Minor test 2 will be conducted on the completion of Chapters 3, 4 and 5. (**Weightage: 10%**)

Assignment 2 on nonlinear optimization will include the following topics (**Weightage 20%**):

- Transmission Voltage Optimization
- Coal Mining
- Power System Disptach
- Chance Constraint Feed Mix Problem
- Simple one sector nonlinear optimal growth model
- Maximum Likelihood Estimation
- Energy Macro Economic Interaction model

Major Examination: Includes all the chapters (**Weighatge 40%**)

The course is reviewed and commented by the f following experts.

Dr. Anoop Singh
Assistant Professor
Department of Industrial and Management Engineering
IIT Kanpur

Dr, Sanjay Singh
Assistant Professor
Department of Humanities and Social Sciences
IIT Kanpur

Suggested readings:

1. Optimization Principles, Narayan S. Rau, John Wiley and Sons Inc., 2003
2. Operation Research: An Introduction, H. Taha, Fifth Indian Reprint 2005, Pearson Prentice Hall, New Delhi.
3. Linear Programming and Network Flow, M. Bazara, et. al., 2nd ed., Wiley, New York, 1990.
4. Linear Programming and Extensions, G. Dantzig, Princeton University Press, Princeton, NJ, 1963

Course No.	
Course Title:	Strategic Management
Number of credits:	3
No. of Lectures – tutorial – practical:	40-0-0
Course coordinator:	Rajat Shurvo Bakshi

Course outline:

The typical business policy course (forerunner of SM Course) evolved over the time to one that emphasizes the total organization and strategic management with an increased interest in business' social responsibilities and ethics. The primary objective of the business education is to develop an understanding of the **political, social, technological, and economic** environment of business. This increasing concern with the effect of environmental issues on the management of the total organization has led leaders in the field to replace the term **Business Policy** with the more comprehensive **Strategic Management**.

Strategic Management is that set of managerial decisions and actions that determines the long-term performance of a corporation. It includes strategy formulation, implementation and evaluation and control. The study of strategic management therefore emphasizes the monitoring and evaluation of environmental opportunities and constraints in light of corporation's strengths and weaknesses.

In contrast, the study of **Business Policy**, with its integrative orientation, tends to look inward. By focusing on the efficient utilization of a corporation's assets, it thus emphasizes the formulation of general guidelines that will better accomplish a firm's missions and objectives. We see, then, that the **STRATEGIC MANAGEMENT** incorporates the concerns of **BUSINESS POLICY** with heavier environmental and strategic emphasis.

Pedagogy

There will be 40 sessions (One hour each) as per the course outline. There will be a **project** for which the guideline to be followed are in Appendix 14 of your textbook. The project will be evaluated through presentation at the end of the term. The case study assignments are designated as [CS] in the course outline. Case Studies and project, both are individual task considering the small size of the class.

Evaluation Procedure

Case Studies (3)	(Evaluation through presentation)	15%
Project	(Evaluation through presentation)	20%
Midterm Exam	(Closed Book Objective Type)	20%
End-term Exam	(Open Book Case based)	45%

Details of course contents and allotted time

Sr. no.	Topics	Time allotted (hours)		
		Lectures	Tutorials	Practical
	Strategic management process			
1&2	Introduction to Policy & Strategy Hierarchy of strategy and Descriptive Model	2		
3&4	Developing Conceptual Skills	2		
	(a) Management Audit Vs. Strategic Audit			
	(b) Financial Analysis: A place to begin			
	Case Study – Dabhol Power Limited			
	Strategy Formulation (A)			
5&6	Business Environment: External	2		
	(i) PEST analysis			
	(ii) 5 Forces Model			
	Superordinate Functions			
7&8	Environment (Natural) [CN/CS (Shell Athabasca)	2		
9&10	Ethics (value system Social obligations)	2		
11	Case Presentation (Dabhol Power Ltd.)	1		
	Business/Government Interface			
12	Nation/State (Nations have strategies) (CN)	1		
13	New Economic Policy Environment (CN)	1		
14	8th Five-Year Plan & Structural Reforms (CN)	1		
15	World governance (WTO/GATT) (CN)	1		
16	Case Presentation (Shell Athabasca)	1		
	Strategy Formulation (B)			
17&18	Business Environment: Internal	2		
19&20	Resources and Core Competences CS (Privatisation of Delhi Mumbai Airports)	2		
21	Situational Analysis (SWOT)	1		
	Mid Term Exam			
	Directional Strategy			
22	Integration: Backward/Forward (CN)	1		
23	Greenfield	1		
24	Diversification (CN)	1		
25	Go Global	1		
	Other business strategies			
26	Turnaround (CN)	1		
27	Disinvestment (CN)	1		
28	Strategic Alliance	1		
29	Mergers and Acquisitions	1		
30	Public Private Partnerships (CN)	1		
	Strategic Alternatives			
31	Alternative Strategies	1		

Sr. no.	Topics	Time allotted (hours)		
		Lectures	Tutorials	Practical
32	Selection of Best Strategies	1		
33	Case Presentation (Privatisation of Delhi Mumbai Airports)	1		
	Implementation & control			
34&35	Culture/Leadership (sets orientation) (CN)	2		
36&37	Structure/Process (CN)	2		
38&39	Measuring Performance (Balance Score Card/EVA)	2		
40	Project Evaluation (Final Presentation)	1		
	End Term Exam			
	Total	40		

The course is reviewed and commented by the following expert.

Mr. Manoj T. Thomas
Assistant Professor
Xavier Labour Relations Institute (XLRI)
Jamshedpur

Suggested readings

The course-contents (REFERRALS) refer to the book **Strategic Management (6th Edition)** by **J. David Hunger and Thomas L. Wheelen** and students are expected to read these chapters before coming to the class.

There will be some handouts on class lectures (designated as [CN]) covering only the main points and hence it is imperative to be attentive in the class.

Additional Readings:

Management: Tasks, Responsibilities, and Practices by Peter Drucker
Competitive Strategy: by Michael E Porter.

Corporate Strategy by Igor Ansoff

Course No.:

Course title:

Risk Management (Infrastructure Projects)

Number of credits:

3

Number of lectures-tutorial practicals:

25-10-20

Course Coordinator:

Dr S K Choudhary

Course Outline

Infrastructure projects (such as power, oil and gas, transport and telecommunications projects) are characterised by (a) high concentration of risk in the early part of the project life cycle (pre-completion) and (b) a risk profile that changes as the project progresses towards completion and starts operation, with a relatively stable cash flows subject to market and regulatory risks. The economic and financial viability of infrastructure projects therefore hinges critically on how the various risk factors are being identified and the risk mitigation systems designed. Resource mobilisation for project financing and financial closure along with various agreements (among the project participants) also depends on the soundness of the risk management systems.

This course intends to provide a useful insight into the intricacies of risk management for infrastructure projects. The students will understand and appreciate the key concepts and learn various analytical tools and techniques with practical applications.

Evaluation procedure

- Class assignments: 25%
- Project work: 30%
- End-term examination: 45%

Details of course content and allotted time

Topics	Allotted time (hours)		
	Lectures	Tutorial	Practicals
PART I: Infrastructure project appraisal and financing <ul style="list-style-type: none"> ▪ Distinguishing features of infrastructure projects ▪ Financial and economic appraisal of projects – review of tools & techniques (NPV/IRR/WACC/LRMC/DSCR/etc.) ▪ BOT projects and ‘non-recourse’ project financing ▪ Sources and instruments of project financing ▪ Sensitivity analysis and Monte Carlo Simulation 	10	4	

Topics	Allotted time (hours)		
	Lectures	Tutorial	Practicals
<ul style="list-style-type: none"> ▪ Investment opportunities as real option <i>Case study (class room discussion)</i> ▪ Project financing through market securitization (L&T case study) <i>Assignments</i> ▪ Risk analysis of a power project from the point of view of the promoter, lenders and regulator (case analysis) ▪ MW Petroleum Corporation (case analysis) 			
PART II: Evaluation & mitigation of risks	15	6	
<ul style="list-style-type: none"> ▪ Evaluation and mitigation of risks for power projects, oil and gas projects, transport projects, telecommunication projects (sector specific issues & risk mitigation systems) ▪ Export credit agencies & political risk insurance ▪ Procurement and contracts management ▪ Project management (exposure to field experience) <i>Case study (class room discussion)</i> ▪ Eurotunnel Project ▪ Dabhol Power Project <i>Assignments</i> ▪ TransGas Pipeline Project (case analysis) ▪ Aguaytia Gas Field Development (case analysis) ▪ Malaysian North-South Expressway (case analysis) 			
PART III: Project work			20
Total	25	10	20

The course is reviewed and commented by the following experts.

S C Gupta
Vice- President
Reliance Energy Limited

S V Gokarn
Executive Director and Chief Economist
CRISIL

Suggested readings

1. Henry A Davis, *Project Finance: Practical Case Studies* (Euromoney Publication)
2. Macquarie Corporate Finance Ltd., *The Guide to Financing Transport Projects* (Euromoney Publication)
3. Milbank, et al, *The Guide to Financing International Oil and Gas Projects* (Euromoney Publication)
4. Wilde Sapte, *The Guide to Financing Build-Operate-Transfer Projects* (Euromoney Publication)
5. Baker & McKenzie, *The Guide to Financing Telecommunication Projects* (Euromoney Publication)

Course No.	
Course Title:	Business communications
Number of credits:	3
No. of Lectures – tutorial – practical:	42-0-0
Course coordinator:	Pradeep Varma

Course Outline:

The objective of this course is to prepare students to communicate effectively in a transnational, globalized business environment. The course introduces students to the basic formats and principles of business communications. It covers communication structures briefly and introduces students to the ever more important area of cross-cultural communication. The course is designed to impart a basic understanding of written business communication, including letters, reports, presentations and email.

The course is *not* intended to teach the basics of the English language and assumes that students will have a good understanding of the English language

The course will be delivered in 14 modules interspersed with class-room quizzes, case studies and home exercises

Evaluation procedure

▪ Assignments	30%
▪ Mid term examination	20%
▪ End-term examination	50%

Details of course content and allotted time

Topic	Time allotted (hours)		
	Lectures	Tutorials	Practicals
Module 1: Business Communication principles	3		
(a) The communication mode			
(b) The elements of good written communication, including spelling and grammar			
(c) Purpose, audience, organization, tone and their roles in communication			
Module 2: Order of Content	3		
(a) “pyramid” organisation of material			
(b) Clarity and Conciseness			
(c) Action Statements			
Module 3: Introduction to Managerial Communication; Communication Models	3		
(a) Leadership communication			

Topic	Time allotted (hours)		
	Lectures	Tutorials	Practicals
(b) Emotional intelligence and cultural literacy			
(c) Cross-cultural skills			
Module 4: Interpersonal Communication; Body Language; Persuasion	3		
(a) Interpersonal skills			
(b) Positive ethos			
Module 5: Organizational Managerial Communication	3		
(a) Structured and Unstructured communication			
(b) High Structure Communication			
(c) Low Structure communication			
Module 6: Communication and Cultural Context-Communication in High and Low Cultural Contexts	3		
(a) High- and Low-context cultures			
(b) The importance of understanding cross-cultural business communication			
Module 7: Managing cross-cultural communications	3		
(a) Language, value systems, perceptions, philosophies			
(b) Time and Space			
(c) Fate and Personal Responsibility			
(d) Face and Face-Saving			
(e) Nonverbal Communication			
Module 8: Technical Communication I- Writing Effective Business Proposals, Business Letters and Memos	3		
(a) Clarity			
(b) Conciseness			
(c) Etiquette			
Module 9: Technical Communication II- Planning and Producing Effective Business Reports	3		
(a) Context			
(b) Structure			
(c) Audience			

Topic	Time allotted (hours)		
	Lectures	Tutorials	Practicals
Module 10: Technical Communication III- Creating Written Presentations	3		
(a) Power-point and other tools			
(b) Colour – relation to topic – relation to audience – Human factors			
(c) Appropriate text and fonts			
(d) Effective use of images – when and when not to use images			
Module 11: Technical Communication IV- Making effective Oral Presentations	3		
(a) Public speaking			
(b) Clarity			
(c) Voice-control			
(d) Eye-contact			
(e) Use of Humour			
Module 12: The Media and Other Tools of Communication	3		
(a) Role of Media			
(b) Making effective use of the media			
(c) Public relations			
(d) The War-book			
Module 13: E-Communication	3		
(a) New modes of communication			
(b) E-mail etiquette			
(c) When chat is an appropriate tool for business communication			
(d) Blogs and other modes of self-expression as tools of business communication			
Module 14: Negotiation-A Communications Focus	3		
(a) Listening skills – the importance of being a good listener			
(b) Building rapport			
(c) Facilitation			
(d) Consensus building			
Total	42		

The course is reviewed and commented by the following experts.

Dr. Runa Sarkar
IIT Kanpur

Prof. Asha Kaul
IIM Ahmedabad

Suggested readings

1. Munter, Mary. *Guide to Managerial Communication*. 7th ed. Upper Saddle River, NJ: Prentice Hall, 2005. ISBN: 0131467042.
2. Harvey, Gordon. *Writing with Sources: A Guide for Students*. Indianapolis, IN: Hackett Publishing, 1998. ISBN: 0872204340.
3. Williams, Joseph. *Style: Toward Clarity and Grace*. Chicago, IL: University of Chicago Press, 1995. ISBN: 0226899152.
4. Kessler, Lauren, and Duncan McDonald. *When Words Collide: A Media Writer's Guide to Grammar and Style*. Belmont, CA: Wadsworth Publishing, 1999. ISBN: 0534561330.
5. Zelazny, Gene. *Say It with Charts: The Executives Guide to Visual Communication*. New York, NY: McGraw-Hill, 2001. ISBN: 007136997X.
6. Brent, Douglas. "Indirect Structure and Reader Response." *The Journal of Business Communication* 22, no. 2 (Spring 1985): 5-8.
7. Daly, John, and Isa Engleberg. "Coping with Stagefright." *Harvard Management Communication Letter* 2, no. 6 (June 1999): 1-4.
8. "Handling Q&A: The Five Kinds of Listening." *Harvard Communications Update* (February 1999): 6-7.
9. Von Hoffman, Constantine. "Getting the Most from Presentation Software." *Harvard Management Communication Letter* 2, no. 6 (June 1999): 7-8.
10. Barnes, Louis. "Managing Interpersonal Feedback." *Harvard Business School Case*. Cambridge, MA. 1989. Case No. 9-483-027.
11. Swift, Marvin H. "Clear Writing Means Clear Thinking Means." *Harvard Business Review* (January-February, 1973). Cambridge, MA. (Now also a Harvard Business School Case, No. 73111.)
12. Singh, Prakash and Meenakshi Raman, *Business Communications*, Oxford University Press, 2006.

Course No.:	
Course title:	Managing negotiations
Number of credits:	3
Number of lectures-tutorial practicals:	
Course Coordinators:	Prof S L Rao M G Ramachandran, Senior Advocate, Supreme Court

This course consists of two modules. Module 1 is Negotiating to Success (to be taken by Prof. S L Rao) and module 2 is Contract - Documentation and negotiation (to be taken by Advocate M G Ramachandran).

Module 1: Negotiating to success (1 credit)

Course Outline

The module-1 of Managing negotiations course would aim to replace "win-lose" outcomes with "all-gain" solutions to highly controversial and complex problems of corporate strategy. It will help the students appreciate rational ways of making business decisions, choosing strategies and tactics in negotiations, inspiring people, and – in sum, being able to negotiate effectively.

Evaluation procedure for Module 1 and Module 2

- Assignments 20+20%
- Examinations 30+30%

Details of course content and allotted time

Session No.	Topics	Time allotted (hours)		
		Lecture	Tutorials	Practicals
I	Overview; Negotiating Situations; Definitions; Essentials; Dealing with the 'Negotiators' Dilemma; Styles	1		
II	Strategic Choices; Decision Tree; Concession Behaviour	1		
III	Multi-Party Negotiation; Your Team; Stages in Negotiations; When Not to Negotiate.	1		
IV	Differentiating Needs from Positions; Decision flaws; Identifying Real Need; The Negotiation Package; L.A.R. and M.S.P.	1		
V	Organization Interfaces; Interface Organization; Organization of Interface; Understanding conflict at the interface; Representatives	1		
VI & VII	Power; Perceptions of Power; Managerial	1		

Session No.	Topics	Time allotted (hours)		
		Lecture	Tutorials	Practicals
	Power; Reducing Dependence; Characteristics of Power in Negotiations; Sources of Power; Desire for Power; Power Styles; Weak Power: Tactics; Using Power			
VIII & IX	Communication and Personality; Influences on Personality; Hierarchy of Individual's Values & Priorities; Identity; Connectedness; Potency; Influences on Personality-Internal State; Listening Listening ability affected by Emotion.	2		
X & XI	Listening styles-Push; Push-Assertion; Pull Style-Empathy; Pull-Attracting; Avoidance-Withdrawal; Videotaped Exercises.	2		
XII	Non-verbal Communications; Videotaped Exercises.	1		
XIII	TACTICS IN NEGOTIATION; The Stages; Some Rules of Conduct; Negotiating Tools.; Tactics for Equals or Betters Tools; Wrong reasons for saying 'Yes'; When to say 'No'; How to say 'No'; Examples of weak positions; Tactics for weak positions	1		
XIV	International Negotiations; Role of Context; Considerations; Preparation; Misunderstandings.	1		
XV & XVI	Cross-Cultural Negotiations; Characteristics of Culture; The Hofstede Model: <i>Power Distance</i> ; 'Masculine' (Task-oriented) <i>Cultures</i> v. 'Feminine' (Quality-of-Life-Oriented) <i>Cultures</i> ; <i>Uncertainty (or Risk) Avoidance</i> ; <i>Uncertainty avoidance</i> ; <i>Individualism vs Collectivism</i> ; <i>Confucian relative Dynamism</i>	2		
	Total	15		

The Module 1 is reviewed and commented by the following experts.

Himanshu Rai
IIM Lucknow

Nivedita Kothiyal
IRMA, Anand

Suggested reading

1. "Negotiation Made Simple" by Prof S L Rao, Excel Books, Delhi, 2005

Module 2: CONTRACT – Documentation and negotiation (2 credits)

Course outline

The objective of the course is to understand and study basic tenets of contract law, to evaluate and interpret contract documents in particular infrastructure contracts and at the end of the course students are in a position to negotiate and draft contracts.

Details of course contents and allotted time

Topics	Time allotted (hours)		
	Lecture	Tutorials	Practicals
1. Basic premise of contract law; various theories relating to contracts and the concept of 'freedom of contract'	1		
2. Formation of contract: Fundamentals of the contract law such as how an agreement comes into existences, offer, acceptance, consideration, competency to contract etc;	1		
3. Performance of contract; Joint rights and liabilities and assignment of benefits and liabilities	2		
4. Factors defeating contractual liability, Breach and consequences of breach including damages (liquidated, special etc);	1		
5. Interpretation and construction of contracts – principles;	1		
6. Privity of contract, assignment;	1		
7. Discharge of contracts: Supervening illegality, frustration etc;	2		
8. Condition precedents to be satisfied by the two parties and consequences;	1		
9. Various types of contracts, agency, bailment, partnership, indemnity and guarantee etc	2		
10. Specific contracts such as carriage, employment,	2		

Topics	Time allotted (hours)		
	Lecture	Tutorials	Practicals
insurance, sale of goods, negotiable instruments, infrastructure etc;			
11. Infrastructure contracts, basic features;	2		
12. Different phases in an infrastructure contract such as negotiation, letter of intent, definitive agreement, construction period, operation, transfer etc in an infrastructure contract;	1		
13. Rights and obligations of the parties during construction period;	2		
14. Financing and financial closure;	2		
15. Changes in law and consequences; Force majeure, political and non-political and consequences;	2		
16. Inter-relation of different agreements and also between different contracting parties;	1		
17. Termination and consequences of infrastructure, contract including special damages;	1		
18. Governing law and arbitration; and	1		
19. Case study of two infrastructure contracts.		2	
Total	26	2	

Module 2 is reviewed and commented by the following experts.

Mr. Jacob Joseph
Lecturer
National University of Advanced Legal Studies (NUALS)
Kaloor, Kochi – 682 017

Dr Bindu Ronald
Associate Professor
Symbiosis College of Law, Pune

Suggested readings

1. Dr. Avtar Singh, Law of Contract and Specific Relief, Eastern Book Company
2. *Dr. V Kesava Rao*, Contracts I : Cases And Materials lexisnexus India
3. Halsbury's Laws Of India - Vol 4 – Bills Of Exchange And Other Negotiable Instruments, Business Associations (2 copies) lexisnexus India
4. Law Relating to Infrastructure Projects" 2nd edition by Piyush Joshi (2003) LexisNexis Butterworths
5. Contracts And Their Management-2ND ED, *Ramaswamy B.S*, 2005, *Lexis Nexis India*
6. Pollock & Mulla's Indian Contract & Specific Relief Acts(Two Volumes) - 12th Ed
7. Model Concession Agreement for PPP in National Highways, State Highways, Operation and Maintenance of Highways and Ports (Overview of the Framework)

Course No.:	NRS 133
Course title:	Environmental management
Number of credits:	4 (3-1-0)
Number of lectures-tutorials-practicals:	42-14-0
Course coordinator:	Dr Nandini Kumar

Course outline

As the concept of curbing pollution changes from end-of-pipe solutions to pollution prevention, it becomes vital for students to become acquainted with the complex and trans-disciplinary nature of environmental management issues specially in a corporate setting and of the inherent challenges in multi-disciplinary group approaches.

Students are then introduced to the wide range of tools used in environmental management and for environmental decision-making. To conclude the course, the evolution of environmental management from being a side issue for firms to becoming a core issue and newer approaches are discussed so that firms practice sustainable management is discussed.

Evaluation procedure

- 2 minor tests : 15%+15%
- 1 major test (end semester) : 50%
- Minor project and presentations : 20%

Details of course content and allotted time

Sr. No.	Topics	Time allotted (hours)	
		Lecture	Tutorial
1	The context of environmental management Overview of the state of the global environment, the earth's natural systems, sustainability and sustainable development	4	
2	Introduction to the evaluation tools EMS, organizational barriers, management responsibility, elements and extent of application, EMS structure	5	
3	ISO 14000: Background, the ISO 14000 series.	6	
4	Environmental risk assessment and its elements, uses.	6	
5	Auditing: scope and objectives, standards for auditing, implementing the audit, procedures, benefits, environmental auditing as a management tool	7	
6	Life Cycle Assessment: Components of LCA, measuring environmental impact, strategic framework for LCA, LCA cost assessment (case studies), triple bottom line concept; sustainable development; (8 lectures)	8	
7	Newer concepts of corporate environmental management Product design for the environment, product stewardship, the social responsibility function	6	

Sr. No.	Topics	Time allotted (hours)	
		Lecture	Tutorial
	of corporations, principles of clean production, packaging, eco-labelling, sustainable procurement (6 lectures)		
8	Minor project and presentations: Mid-term and at the end of the semester (14 tutorials)		14
	Total	42	14

The course is reviewed and commented by the following experts.

Dr Prateek Sharma
Reader
I P University, Delhi

Dr Runa Sarkar
Department of Industrial and Management Engineering
Indian Institute of Technology, Kanpur

Textbooks

- 1 *Corporate Environmental Management: Systems & Strategies* edited by Richard Welford, Volumes 1 and 2. (Volume 1, Part 1; Part 2, chapters 3, 7, 8; Part 3, chapter 14)
- 2 *Environmental management in organizations, the IEMA Handbook* edited by John Brady, Earthscan, 2005 (Sections 1.1, 1.2, 1.3, 3.2, 3.4, 4.3, 4.4, 5.3)
- 3 *Environmental planning and management*, Christian N Madu, Imperial College Press, 2007 (Chapters 2, 3, 4, 6, 7, 8, 10)
- 4 *ISO 14000 Environmental Management*, David L Goetsch and Stanley B Davis, Prentice Hall, 2001.
- 5 *Environmental Management Systems, (third edition)* Christopher Sheldon and Mark Yoxon, Earthscan Publications, First South Asian Edition 2007
- 6 *Pollution: sources, effects and control*, edited by R M Harrison (selected chapters), Royal Society of Chemistry
- 7 *Introduction to environmental engineering and science*, Gilbert M Masters, Second edition, Pearson Education, 2004. (Chapter 9)
- 8 *Hazardous Waste Management*, M D LaGrega, P L Buckingham, J C Evans, McGraw-Hill International Edition (chapters on environmental audits, risk assessment)

Additional readings

- 1 *Cases in Environmental Management and Business Strategy* Richard Welford (ISBN: 0273603132).
- 2 *Environmental Management Strategies: The 21st Century Perspective*, Gabriele Crognale (Prentice Hall Ptr Environmental Management Series, Vol 5).
- 3 *Tools to Aid Environmental Decision Making*, Virginia H. Dale and Mary R. English (eds.). 1999, New York: Springer.
- 4 *Basic Concepts in Environmental Management*, Kenneth M. Mackenthun 1999, Boca Raton, FL: Lewis

Course No:	NRS162
Course title:	Hydrology and watershed science
Number of credits:	4 (3-0.5-0.5)
No of lectures-tutorial-practical:	42-7-14
Faculty:	Dr. Ram Karan Singh

Course outline

This course will introduce the concepts of hydrology and watershed science and its real life application. It would also provide an understanding of the basic methods and techniques to measure and analyze different watershed parameters. The course would provide the students with an overview of planning, implementation, monitoring and evaluation of watershed development activities and consequent changes. The course would enable the students to analyze, from a watershed management perspective, resource management issues and problems affecting natural resource use and conservation and thus the sustainable development.

Evaluation procedure

- Minor tests I: 15%
- Minor test II: 15%
- Quizes (surprised/announced): 10 %
- Review paper presentation: 10%
- Field investigations: 10 %
- Major test: 40%

Details of course content and allotted time

<i>Topic</i>	Allotted time (hours)		
	<i>Lecture</i>	<i>Tutorials</i>	<i>Practicals</i>
Introduction to watershed science, concept and definition; its importance in emerging water scenario (world and India)	2	0	0
Rationale for watershed approach; components of watershed: water, land, and biotic (both human and nonhuman)	1	0	0
Landscape defining processes: climatology, hydrology, geology and soil; spatial and temporal changes in processes	2	0	0
Characteristics of watershed: size, shape, slope, topography, drainage, land use etc. and its implications with comparative analysis	2	0	0
Hydrological cycle in watershed: precipitation, interception, evaporation, transpiration, infiltration, runoff, storage (reservoirs and ground water), transfer, and their behaviour in watershed; Properties of hydrological cycle, portions affected by societal interventions	4	0	0

<i>Topic</i>	Allotted time (hours)		
	<i>Lecture</i>	<i>Tutorials</i>	<i>Practicals</i>
Precipitation: Types and characteristics, extreme events average depth over area; depth-area-duration relation, rainfall-runoff relationship	2	2	0
Evaporation and transpiration: Factors affecting evaporation and transpiration in a watershed, actual and potential evapotranspiration; measurement and estimation of evaporation and transpiration	2	2	0
Streams: Drainage pattern and density, stream ordering	2	1	0
Runoff: Watershed factors affecting runoff; measurement and estimation of runoff; water yield; hydrograph	2	1	0
Water balance: Estimation, importance in watershed development	2	1	0
Land in watershed: Landscape approach, geomorphology; soil survey, soil erosion and its types, soil loss equation; methods to control soil erosion	3	0	0
Biotic elements: Vegetation patterns; land use patterns, land capability	3	0	0
Socio-economic factors: Demographic profile; sociological factors land tenure system and property rights; resource access and equity	2	0	0
Water harvesting: water conservation, and management, measures in a watershed	2	0	0
Watershed Change: Agents and causes of change in watershed (both natural and human induced)	1	0	0
Effects of humans and livestock, changes of concern	1	0	0
Watershed management:			
Concepts and framework of watershed development and management	2	0	0
Elements of integrated watershed management	1	0	0
Criteria for prioritizing watershed for development	1	0	0
Monitoring and evaluation approaches for watershed management projects and programs	1	0	0
Socio-economic, institutional elements and challenges of watershed management	1	0	0
Multiple uses and limited resources of watershed, Prioritization of watershed for development challenges faced by communities and resource managers, case studies of watershed management	2	0	0
Term paper (review)			14
Total	42	7	14

The course is commented and reviewed by the following experts.

Dr A Sarangi
Senior Scientist
Water Technology Centre
IARI, Pusa Complex, New Delhi

Dr Ashok Kumar Kesari
Associate Professor
Civil Engineering Department
Indian Institute of Technology
New Delhi

Basic textbooks:

1. *Paranjape, S., Joy, K J.*, 1998, Watershed based development: a source book., Bharat Gyan Vigyan Samithi, New Delhi
2. Andy D Ward and William J Elliot. Ed, 1995 Environmental Hydrology, Lewis Publishers New York
3. Peter E Black, 1996, Watershed Hydrology, Lewis Publishers, London
4. Rajvir Singh, 2003, Watershed planning and mangement, Yash publishing House, Bikaner, India.
5. K.Subramanya, 2004, Engineering Hydrology, Tata McGraw-Hill, NewDelhi

Suggested reading:

1. Rajesh Rajora, 1998, Integrated watershed management, Rawat publishers, Jaipur
2. *Purandare A P and A K Jaiswal*, 1995, Watershed development in India, National institute of rural development, Hydrabad
3. J V S Murthy, 1994, Watershed Management, New age international publishers, New Delhi
4. FAO 1986, Strategies, approaches, and systems in integrated watershed management

Course No:	NRS (Elective Course)
Course title:	Geoinformatics for Natural Resource Management
Number of credits:	4 (2-0-2)
No. of lectures-tutorial-practical:	28-0-56
Course coordinator:	Dr. P.K. Joshi

Course outline:

The course is conceptualized to provide competency in remote sensing (RS), geographic information systems (GIS), global positioning system (GPS), and related technologies. The course is designed as an elective to take up research work (at M.Sc./M.Phil/Ph.D. level) in the sub- fields of environmental science and natural resource management. The course is not limited to the topics given below. The students are suggested to read different books, magazines and peer reviewed journals.

Evaluation Procedure

- 2 minor tests: 20%
- Practicals: 40%
- Major exam: 40%

Details of course content and allotted time

No.	Topic	Allotted time (hours)		
		Lectures	Tutorials	Practicals
1	Geoinformatics for NRM (Vegetation, water, urban landscape, soils, mineral, geomorphology)	4		6
2	Digital Image Processing (Rectification, enhancements, classification – unsupervised, supervised, hybrid, accuracy assessment)	8		14
3	Geographical Information System (Introduction, Data and Data Entry, Data Structure, Data Compression, Remote Sensing and GIS, Spatial Modeling, Terrain Modeling, Mobile GIS, Web Based GIS)	6		24
4	Applications of Remote Sensing (Case Studies) National Initiatives (NNRMS/NRDMS, ISRO-DOS), Forest Cover/Type Mapping, Degradation, Biomass estimation, Habitat Analysis, Biodiversity Characterization, Environmental Monitoring, Crop Monitoring, Precision Farming, Geological Mapping, Geo-hazard Assessment, Urban Sprawl, Solid Waste Management, Water Resource Mapping, Runoff and Soil Erosion Modeling, Watershed Management, Se Surface Temperature, Earth Observation Programme)	10		12
	Total	28		56

Practical

P1-P6	–	Studying different features in data
P7-P20	–	Digital Image Processing
P21-P44	–	GIS data analysis
P45-P56	–	Spatial modeling

The course is reviewed and commented by the following experts.

Prof. P.S. ROY
Deputy Director (RS & GIS – AA)
National Remote Sensing Agency, Balanagar
HYDERABAD - 500 037

Prof. P.K. GARG
Department of Civil Engineering
Indian Institute of Technology Roorkee
ROORKEE -247 667

Dr. MILAP PUNIA
Associate Professor
Room Number 317
CSR, Jawaharlal Nehru University
NEW DELHI 110 067

Mr Sumit Adhikari
Assistant Manager (Training)
RMSI Private Limited
Noida

Suggested Readings

Text Books

1. Burrough, P.A. and McDonnell, R.A. (1998) *Principles of geographical information systems*. Oxford University Press, Oxford, 327 pp.
2. Campbell, J.B. (2002). *Introduction to remote sensing*, 3rd ed., The Guilford Press. ISBN 1-57230-640-8.
3. Heywood, I., Cornelius, S., and Carver, S. (2006) *An Introduction to Geographical Information Systems*. Prentice Hall. 3rd edition.
4. Jensen, J.R. (2000). *Remote sensing of the environment: an Earth resource perspective*. Prentice Hall. ISBN 0-13-489733-1.
5. Joseph, G (2003). *Fundamentals of Remote Sensing*. Universities Press, Hyderabad
6. Lillesand, T.M.; R.W. Kiefer, and J.W. Chipman (2003). *Remote sensing and image interpretation*, 5th ed., Wiley. ISBN 0-471-15227-7.
7. Longley, P.A., Goodchild, M.F., Maguire, D.J. and Rhind, D.W. (2005) *Geographic Information Systems and Science*. Chichester: Wiley. 2nd edition.

8. Malczewski, J. (1999). *GIS and Multicriteria Decision Analysis*. New York: John Wiley and Sons

Magazines

1. GIS@development
2. Goespatial today
3. Coordinates
4. GIS World
5. GIM International
6. GPS World

Journals

1. Journal of Indian Society of Remote Sensing
2. Asian Journal of Geoinformatics
3. Geocarto International
4. International Journal of Geoinformatics
5. International Journal of Remote Sensing
6. Remote Sensing of Environment
7. Ecological Modelling
8. ISPRS Journal of Photogrammetry and Remote Sensing
9. Agricultural and Forest Meteorology
10. Advances in Water Resources

Course No.:	NRS 135
Course title:	Science and Policy of Climate Change
Number of credits:	4 (3-1-0)
Number of lectures-tutorials-practicals:	41-15-0
Course coordinator:	Sangeet Srivastava

Course outline

Climate change and variability is a global concern across the boundaries. It has shaped societies and now it presents a further challenge to societies to adapt to it. The scope of the course is science and policy of climate change, with a focus on India. This course provides an introduction to the earth's climate system and its inter-relationship with various socio-economic systems. It also goes into aspects of vulnerability to and impacts of climate change and covers the response measures to combat climate change, namely adaptation and mitigation, both at policy as well as at implementation level to enable students to understand science and policy aspects of climate change in either applied or academic context.

Evaluation procedure

▪ 2 Minors (15+15)	30%
▪ Quiz	10%
▪ Term paper	20%
▪ 1 Major	40%

Details of course content and allotted time

No.	Topics	Allotted time (hours)	
		Lectures	Tutorials
1	Scientific aspects of climate change	15	2
	➤ The Climate System <ul style="list-style-type: none"> • Earth's climate – structure and climatic zones • Land, Ocean, Cryosphere, Biosphere 	2	
	➤ Drivers of Climate system <ul style="list-style-type: none"> • Solar radiation, topography, wind and ocean currents, El Nino, La Nina 	2	
	➤ Feedback and interaction mechanisms <ul style="list-style-type: none"> • sea-air, ice-air, ice-sea, land-air, land-sea etc. 	2	
	➤ Climatic cycles <ul style="list-style-type: none"> • Hydrological, carbon, nitrogen, tree rings, ice core analysis 	1	
	➤ Paleoclimatology, tree rings, ice core analysis	1	
	➤ Introduction to Climate system modeling and simulations <ul style="list-style-type: none"> • General Circulation models • Regional circulation models 	2	

No.	Topics	Allotted time (hours)	
		Lectures	Tutorials
	<ul style="list-style-type: none"> ➤ Global warming, radiation, greenhouse gases: sources & sinks <ul style="list-style-type: none"> • Temperature & precipitation reconstruction (Paeleoclimatology) 	2	
	➤ Natural variability vs. Anthropogenic forcing to climate system	2	
	➤ Recent issues in climate change (ozone hole, melting of glaciers, atmospheric brown clouds)	1	
	Tutorials: Discussion on climate simulations using general and regional circulation models, projections from impact models and uncertainties		2
2	Vulnerabilities to and Impacts of Climate Change	4	2
	<ul style="list-style-type: none"> ➤ Sectoral vulnerabilities and impacts <ul style="list-style-type: none"> • Agriculture and forestry • Water resources • Sea level rise 	3	
	<ul style="list-style-type: none"> • Extreme events • Health • Insurance 	1	
	Tutorials – Case studies		2
3	Policy aspects of climate change	7	2
	<ul style="list-style-type: none"> ➤ International efforts and policy frameworks <ul style="list-style-type: none"> • IPCC, UNFCCC, Kyoto Protocol, their history, objectives, activities 	2	
	➤ Equity issues	1	
	➤ Key issues in multilateral negotiations on climate change	1	
	➤ Developed and developing country commitments under the UNFCCC	1	
	➤ Linkages of UNFCCC with other international conventions (CBD, CCD, Ramsar, MDG etc)	1	
	➤ India's national policy framework	1	
	Tutorials – Review of select policies, mechanism, institution etc. and discussion		2
4	The Carbon Market	9	2
	➤ Kyoto Protocol and its flexibility mechanism (CDM, JI, IET)	1	
	➤ CDM project cycle and modalities and procedures	2	
	➤ Climate change mitigation programmes in energy and industry sector -: Case studies (with focus on India)	2	
	➤ CO ₂ sequestration, forests and other sinks in India, opportunities and concerns	2	

No.	Topics	Allotted time (hours)	
		Lectures	Tutorials
	➤ The global carbon market	2	
	Tutorials <ul style="list-style-type: none"> • Discussion / calculation of baselines • Topical issues with CDM Executive Boards (new methodologies, bundling of small projects, sectoral or policy CDM projects) 		2
5	Climate Change adaptation	4	1
	➤ Adapting to climate change <ul style="list-style-type: none"> • Traditional wisdom versus climate change adaptation 	2	
	➤ Adaptation and sustainable development linkages	1	
	➤ Linking climate change mitigation and adaptation	1	
	Tutorials <ul style="list-style-type: none"> • Case Studies for various sectors 		1
6	Synthesis of recent issues on climate change[#]	2	
7	Term-Paper discussion and presentation by students[†]		6
	Total	41	15

[#] Extended lecture

[†] Each student will be asked to submit a short term paper on selected topics of his interest. It will be presented during the lecture hours. Additionally, there will be two tutorials, which may involve an analysis of an article/news item or presentation of a case study.

The course is reviewed and commented by the following experts.

Dr O P Sharma
Professor
Centre for Atmospheric Sciences
Indian Institute of Technology
New Delhi

Dr Subodh Sharma
Advisor
Ministry of Environment and Forests
New Delhi

Suggested readings:

1. **Meteorology Today: An Introduction to Weather, Climate, and the Environment** – Ahrens, C D, Brooks Cole, 7th Ed. (2002)
2. **A Climate Modeling Primer** - Henderson Sellers, A & K McGuffie (1996), Chichester: Corley, (2nd Edition)
3. **Climates of South Asia** - G. B. Pant and K. Rupa Kumar, John Wiley & Sons (1997)
4. **Climate Change: Causes, Effects and Solutions** - Hardy, John (2003), John Wiley & Sons

5. **Climate change: perspectives five years after Kyoto** – Velma Grover (ed.) (2004), Hamilton, Ontario, Canada, ISBN 978-1-57808-326-8
6. **IPCC, Assessment Reports 4 (AR4)**
 - The scientific basis
 - Impacts, adaptation and vulnerability
 - Mitigation
7. **Handouts**
8. **<http://www.worldclimate.com/>**

Course No:	NRS172 (Core Course)
Course title:	Principles of Geoinformatics
Number of credits (L-T-P):	4 (2.25-0-1.75)
No. of lectures-tutorial-practical:	20-0-50
Course coordinator:	Dr. P.K. Joshi

Course outline:

The course is an introductory in remote sensing and image interpretation. Remote sensing and its kindred technologies viz., geographical information system (GIS) and global position system (GPS) will be taught. The contents are designed as a compulsory course material for all the students undergoing M.Sc. (Environmental Science/Natural Resource Management/Water Resource Management) and pre-Ph.D. The course is not limited to the topics given below. The students are suggested to read different books, magazines and peer reviewed journals. The details of the sub fields will also be dealt in Elective.

Evaluation Procedure

- 2 minor tests: 20%
- Practical: 40%
- Major exam: 40%

Details of course content and allotted time

No.	Topic	Allocated time (hours)		
		Lectures	Tutorial	Practical
1	Fundamentals of Maps (Introduction, map reading, scale, types and sources, map co-ordinate systems and projections (Cylindrical, Conic, Azimuth), map preparation, visualization and guidelines of mapping)	4	0	2
2	Aerial Photographs (Introduction, history, photography, geometry, scale, measurements, relief displacement, parallax, stereo photographs, height determination, orthophotographs, applications)	6	0	8
3	Introduction to Remote Sensing (RS) (Introduction, scanning, physics of RS, EMR, platforms and sensors, resolution, multispectral, thermal, microwave (SAR, SLAR, RADAR), LiDAR, hyper spectral, image interpretation, classification)	10	0	24
4	Global Position System (Introduction, basic concepts, functions, data collection, methods)	2	0	5
5	Geographical Information System (Introduction, concepts, features, data models, spatial data &	6	0	10

No.	Topic	Allocated time (hours)		
		Lectures	Tutorial	Practical
	non-spatial data, integration and analysis)			
6	Applications of Remote Sensing and GIS (Relevance in planning, Land use/land cover, forestry, agriculture, water resources, urban sprawl, environmental studies, disaster management)	2	0	1
		28	0	50

Practical

- P1-P2 – Topographic Sheets, map sheets, thematic maps
P3-P10 – Study of aerial photographs
P11-P34 – Processing of satellite data
P35- P39 – Exercise on GPS
P40- P49 – Life cycle of database creation
P50 – Visualization

Suggested Readings

Text Books

- Burrough, P.A. and McDonnell, R.A. (1998) *Principles of geographical information systems*. Oxford University Press, Oxford, 327 pp.
- Campbell, J.B. (2002). *Introduction to remote sensing*, 3rd ed., The Guilford Press. ISBN 1-57230-640-8.
- Heywood, I., Cornelius, S., and Carver, S. (2006) *An Introduction to Geographical Information Systems*. Prentice Hall. 3rd edition.
- Jensen, J.R. (2000). *Remote sensing of the environment: an Earth resource perspective*. Prentice Hall. ISBN 0-13-489733-1.
- Joseph, G (2003). *Fundamentals of Remote Sensing*. Universities Press, Hyderabad
- Lillesand, T.M.; R.W. Kiefer, and J.W. Chipman (2003). *Remote sensing and image interpretation*, 5th ed., Wiley. ISBN 0-471-15227-7.
- Longley, P.A., Goodchild, M.F., Maguire, D.J. and Rhind, D.W. (2005) *Geographic Information Systems and Science*. Chichester: Wiley. 2nd edition.

Magazines

- GIS@development
- Goespatial today
- Coordinates
- GIS World

Journals

- Journal of Indian Society of Remote Sensing
- Asian Journal of Geoinformatics
- Geocarto International
- International Journal of Geoinformatics
- Remote Sensing of Environment

Course No.:	NRS 133
Course title:	Environmental planning and management
Number of credits:	4 (3-1-0)
Number of lectures-tutorials-practicals:	42-14-0
Course coordinator:	Dr Nandini Kumar

Course outline

As the concept of curbing pollution changes from end-of-pipe solutions to pollution prevention, it becomes vital for students to become acquainted with the complex and trans-disciplinary nature of environmental management issues in a corporate setting and of the inherent challenges in multi-disciplinary group approaches.

They are then introduced to the wide range of tools used in environmental management and for environmental decision-making. To conclude the course, the evolution of environmental management from being a side issue for firms to becoming a core issue so that firms practice sustainable management is discussed.

Evaluation procedure

- 2 minor tests : 15%+15%
- 1 major test (end semester) : 50%
- Group discussions + seminar : 5% + 5%
- Case study writing : 10%

Details of course content and allotted time

Sr. No.	Topics	Time allotted (hours)	
		Lecture	Tutorial
1	Introduction to link between governance, regulatory, social dimensions of environmental issues and the place of environmental management in such a scenario; Introduction to environmental planning, design, and strategy; framework for planning; organizational culture and environmental planning; industrial ecology.	8	
2	Environmental risk assessment and its elements, uses.	4	
3	EMS, organizational barriers, management responsibility, elements and extent of application, EMS structure.	5	
4	ISO 14000: Background, the ISO 14000 series.	5	
5	Auditing: principles and practice of environmental auditing, importance of	7	

Sr. No.	Topics	Time allotted (hours)	
		Lecture	Tutorial
	monitoring in pollution auditing, objectives, procedures, benefits, environmental auditing as a management tool		
6	Product design for the environment, product stewardship, the social responsibility function of corporations	5	3
7	Life Cycle Assessment: Components of LCA, measuring environmental impact, fishbone diagrams, strategic framework for LCA, LCA cost assessment (case studies), triple bottom line concept; sustainable development.	8	3
8	Seminars and group discussions:		8
	Total	42	14

The course is reviewed and commented by the following experts.

Dr Prateek Sharma
Reader
Department of Environmental studies
IP University, New Delhi

Dr Runa Sarkar
Department of Industrial and Management Engineering
Indian Institute of Technology
Kanpur

Suggested readings

- 1 *Hazardous Waste Management*, M D LaGrega, P L Buckingham, J C Evans, McGraw-Hill International Edition (chapters on environmental audits, risk assessment)
- 2 *ISO 14000 Environmental Management*, David L Goetsch and Stanley B Davis, Prentice Hall, 2001.
- 3 *Environmental Management Systems, (third edition)* Christopher Sheldon and Mark Yoxon, Earthscan Publications, First South Asian Edition 2007
- 4 *Understanding our environment: an introduction to environmental chemistry and pollution* R M Harrison (environmental monitoring strategies and managing environmental quality), Royal Society of Chemistry, 1999.
- 5 *Pollution: sources, effects and control*, edited by R M Harrison (selected chapters), Royal Society of Chemistry
- 6 *Introduction to environmental engineering and science*, Gilbert M Masters, Second edition, Pearson Education, 2004. (Chapter 9)
- 7 *Corporate Environmental Management: Systems & Strategies* edited by Richard Welford's edited book on and his case book

- 8 Cases in Environmental Management and Business Strategy Richard Welford (ISBN: 0273603132)).Environmental Management Strategies: The 21st Century Perspective Gabriele Crognale (Prentice Hall Ptr Environmental Management Series, Vol 5).
- 9 *Tools to Aid Environmental Decision Making*, Virginia H. Dale and Mary R. English (eds.). 1999, New York: Springer.*Basic Concepts in Environmental Management*, Kenneth M. Mackenthun 1999, Boca Raton, FL: Lewis

