

## **VI Semester Skill Enhancement Courses**

Mathematics Stream:

Sci Lab / Renewable Energy & Energy Harvesting

Bio-Sciences Stream:

Bio-fertilizers / Nursery and Gardening

Arts Stream:

Women & Child Rights / Good Governance

Commerce Stream:

Regulation of Insurance Business / Central Banking

# Sci Lab

2 Credits

## Unit – I

Introduction to Scilab – what is scilab, downloading & installing scilab, a quick taste of scilab.

The Scilab Environment – manipulating the command line, working directory, comments, variables in memory, recording sessions, the scilab menu bar, demos.

Scalars & Vectors – introduction, initializing vectors in scilab, mathematical operations on vectors, relational operations on vectors, logical operations on vectors, built-in logical functions.

## Unit – II

Scalars & Vectors – elementary mathematical functions, mathematical functions on scalars, complex numbers, trigonometric functions, inverse trigonometric functions, hyperbolic functions.

Matrices – introduction, arithmetic operators for matrices, basic matrix processing.

Polynomials – introduction, creating polynomials, basic polynomial commands, finding roots of polynomial, polynomial arithmetic, miscellaneous polynomial handling.

**Text** Er. Hema Ramachandran, Dr. Achuthsankar S. Nair, *Computer SCILAB–A Free Software to MATLAB*

**References** Digite, *Introduction to Scilab*

Digite, *Optimization in Scilab*

Scilab Enterprises, *Scilab for Very Beginners*

Digite, *Introduction to Discrete Probabilities with Scilab*

**Note:** Student friendly video lecturers pertaining to this course are available at <http://spoken-tutorial.org/>

Teachers are advised to teach this courses in the computer lab itself, so that the interested students may derive some time to perform few programs their own.

# Renewable Energy & Energy Harvesting

2 Credits

## Unit-I

**Fossil fuels and Alternate Sources of energy:** Fossil fuels and nuclear energy, their limitation, need of renewable energy, non-conventional energy sources. An overview of developments in offshore Wind Energy, Tidal Energy, Wave energy systems, Ocean Thermal Energy Conversion, solar energy, biomass, biochemical conversion, biogas generation, geothermal energy tidal energy, Hydroelectricity.

**Solar energy:** Solar energy, its importance, storage of solar energy, solar pond, non plate collector, solar distillation, solar cooker, solar green houses, solar cell, absorption air conditioning. Need and characteristics of photovoltaic (PV) systems, PV modules and equivalent circuits, and sun tracking systems.

## Unit-II

**Wind Energy harvesting:** Fundamentals of Wind energy, Wind Turbines and different electrical machines in wind turbines, Power electronic interfaces, and grid interconnection topologies.

**Ocean Energy:** Ocean Energy Potential against Wind and Solar, Wave Characteristics and Statistics, Wave Energy Devices. Tide characteristics and Statistics, Tide Energy Technologies, Ocean Thermal Energy, Osmotic Power, Ocean Bio-mass.

**Geothermal Energy:** Geothermal Resources, Geothermal Technologies.

**Hydro Energy:** Hydropower resources, hydropower technologies, environmental impact of Hydro power sources.

## Reference Books:

1. Non-conventional energy sources - G.D Rai - Khanna Publishers, New Delhi
2. Solar energy - M P Agarwal - S Chand and Co. Ltd.
3. Solar energy - Suhas P Sukhative Tata McGraw - Hill Publishing Company Ltd.
4. Godfrey Boyle, "Renewable Energy, Power for a sustainable future", 2004, Oxford University Press, in association with The Open University.
5. Dr. P Jayakumar, Solar Energy: Resource Assesment Handbook, 2009
6. J.Balfour, M.Shaw and S. Jarosek, Photovoltaics, Lawrence J Goodrich (USA).
7. [http://en.wikipedia.org/wiki/Renewable\\_energy](http://en.wikipedia.org/wiki/Renewable_energy)

## Bio-fertilizers

2 Credits

### Unit-I

1. General account about the microbes used as biofertilizers, Rhizobium, Azotobacter importance in cultivation.
2. Cyanobacteria as biofertilizer, Nitrogen fixation BGA and Azolla in rice cultivation

### Unit-II

1. Mycorrhizal association and types of mycorrhizal association; Isolation and inoculums production of VAM and its influence on crop plants.
2. Organic farming- Green manuring and organic fertilizers, recycling of biodegradable municipal , agricultural and industrial wastes.

### Suggested Readings:

1. Vayas, S.C, Vayas , S. and Modi, H.A 1998 Bio-fertilizers and organic farming, Akta Prakasham, Nadiad
2. Subha Rao, N.S.2000, Soil microbiology, Oxford & IBH publishers, New Delhi
3. Sathe, T.V. 2004 vermiculture and organic farming. Daya publishers
4. Dubey, R.C., 2005 A text book of biotechnology S.Chand & Co., New Delhi

## Nursery and Gardening

2 Credits

### Unit-I

1. Nursery: Definition, objectives, scope and building up of infrastructure for nursery.
2. Seed: structure and types- seed dormancy; causes and methods of breaking dormancy- seed storage, seed banks.
3. Vegetative propagation: air layering, cutting, selection of cutting, collecting season, rooting medium and planting of cuttings- Hardening of plants- green house- mist chamber.

### Unit-II

1. Gardening definition, objectives and scope- different types of gardening
2. Computer application in landscaping - Gardening operations
3. Study of cultivation of different vegetables: Cabbage, Brinjal, Lady's fringer, Tomatoes and Carrots.

### Suggested Readings:

1. Bose T. K & Mukherjee , D.,1972, Gardening in India , Oxford & IBH Publishing Co., New Delhi
2. Sandhu,M.K., 1989, Plant Propagation. Wile Eastern Ltd.,Bangalore, Madras.
3. kumar,N.,1997, Introduction to Horticulture,Rajalakshmi Publications,Nagercoil.
4. Edmond Musser & Andres , Fundamentals of Horticulture ,McGraw Hill Book Co.,New Delhi
5. Agrawal,P.K.1993,Hand Book of Seed Technology , Dept . of Agriculture and Cooperation, National Seed Corporation Ltd., New Delhi.
6. Janick ules .1979 . Horticultural science. (3<sup>rd</sup> Ed), W.H Freeman and co., San Francisco, USA.

## Women & Child Rights

2 Credits

### Unit - I

1. Introduction: Definition, perspectives and foundations of Human Rights.
2. Universal Declaration of Human Rights (1948).
3. National Human Rights Commission of India.
4. Women's Rights as Human Rights; UN Convention on Elimination of all forms of Discriminations against Women (CEDAW). Crime Against Women – Domestic Violence – Dowry Related Harassment and Dowry Deaths – Molestation – Sexual Abuse and Rape – Loopholes in Practice – Law Enforcement.
5. Women Rights in Indian Constitution – Fundamental Rights and Directive Principles.
6. Protective legislation for women in India - SITA (1956), Dowry Prohibition Act (1961), PNDT (1994), Domestic violence (Prevention) Act (2005) and Prevention Sexual Harassment of women at Workplace Act (2013).
7. Women's Right to Property.

### Unit – II

1. Children's Rights: Definitions, meaning and importance.
2. The United Nations **Convention on the Rights of the Child (UNCRC) -1990**.
3. Safeguards of Indian Constitution for Rights of Children.
4. Barriers to realization of Child Rights.
5. National Commission for Protection of Child Rights (NCPCR)

### References:

1. Agarwal, H.O., Implementation of Human Rights Covenants with Special Reference to India (Allahabad: Kitab Mahal, 1983).
2. Bajwa, G.S. and D.K. Bajwa, Human Rights in India: Implementation and Violations (New Delhi: D.K. Publishers, 1996).
3. Nitya Rao "Good Women do not Inherit Land" Social Science Press and Orient Blackswan 2008
4. International Solidarity Network "Knowing Our Rights" An imprint of Kali for Women 2006
5. P.D.Kaushik "Women Rights" Bookwell Publication 2007
6. Aruna Goal "Violence Protective Measures for Women Development and Empowerment" Deep and Deep Publications Pvt 2004
7. Monica Chawla "Gender Justice" Deep and Deep Publications Pvt Ltd.2006
8. Preeti Mishra "Domestic Violence Against Women" Deep and Deep Publications Pvt 2007
9. ClairM.Renzetti, Jeffrey L.Edleson, Raquel Kennedy Bergen, Source Book on "Violence Against Women" Sage Publications 2001.
10. Diwan, Paras and Peeyushi Diwan, Children and Legal Protection (New Delhi: Deep and Deep, 1994).
11. Pachauri, S.K., Children and Human Rights (Delhi: APH Publications, 1999).

# Good Governance

2 Credits

## Unit - I: Introduction

1. Meaning Definitions and importance of Governance
2. Concepts of Good Governance
3. Government and Governance
4. Public and Private Governance

## Unit- II: State and Governance

1. The State, Market and Civil Society
2. Techniques of Good Governance
3. Good Governance and Civil Society
4. IT Act 2000 , ICT and Good Governance