

OPEN ELECTIVE: URBAN FARMING

(1 Theory & 2 Practical's/ field work per week) - 3 credits

Evaluation will be based on 2 projects, one a group project in public or semi-public space and the other an individual project at home (Rooftop/Balcony) or any private space.

Overview

Urban Farming (UF) relies on understanding natural systems such as soil fertility, surface profile and drainage, plant biology and growth, and pollination systems, (including bee colonies). Students will explore the science behind these systems throughout the course. Because an urban farm is its own microcosm of agriculture, many of the same types of technologies that farmers have used for many years (compost and watering systems, for example) are explored possibilities like customer supported agriculture. Students will design their own farming systems and technologies for their urban farms, exploiting spaces like terraces, vacant lots, open spaces, balconies, vertical surfaces, etc.

Learning Outcomes

Student will be able to understand a given site in terms of what (soil, plants, sunlight, water and pollination agents) the given space can accommodate, soil fertility (and how to enrich it through recycling nutrients in urban wet waste and composting, etc.), existing surface profile and drainage pattern (and re-engineer it if necessary), microclimate, etc. and design a farming project on the site, selecting the appropriate plant species and farming actions including preparing the soil, watering facility, sourcing seeds/ saplings, enhancing pollination, controlling pests naturally, harvesting, etc.

Modules

1. What is urban farming and why urban farming (background, contexts, and motivations)
- (1-Week)

Present urban scenario, need for urban farming, advantages of UF. Climate change, carbon sequestration into soil, urban climate – heat islands, albedos of urban surfaces, passive cooling, relation between soil microbes, food and health, underutilised (private and public) spaces in urban development, recycling of grey water, kitchen waste, etc - irrigation and nutrient inputs to food production. Micro-solutions (individual / household / small communities) to macro level problems of development. Scope of UF in cities, impact of UF on environment of city, on dwindling water resources and increasing power consumption, on social inclusion, on health, on monetary savings.

GIS in planning – identifying vacant lands, water bodies, surface profile – digital elevation modelling (DEM) geo tagging, etc., for urban farming and related activities, facilitating customer supported agriculture by optimizing transport of food, wet wastes and composts and other farming inputs.

(1 - Week)

**To practice Urban Farming - Where: (with case examples and field visits)
(2 - Weeks)**

- Rooftop urban agriculture
- Greens and microgreens
- CSA (customer supported agriculture)
- Vertical farming
- Hydroponics
- Aquaponics – Re- circulatory aqua culture system
- Z'farming or zero-acre age farming.

Practical sessions – the How : (Practical sessions)

Each student should select 2 projects, a group project in public or semi-public space, and an independent project in any private space.

- Investigate light, wind pattern, humidity - to maximize photosynthesis - and carbon sequestration into soil.
- Assessing the soil food web - Collection of soil and water samples for quality testing: preparation of soil bed.
- Engineering a beehive
- Composting - assess the amount of organic waste generated nearby and compost the same
- Engineer a solution to an irrigation watering and drainage challenge.
- Design and create a mini food garden.
- Assessing the micro climate parameters in various areas of the city.
- Improving the urban farm: Students will finalize their model urban farms, testing systems and improving any that do not function as expected.

The following tasks / aspects/ factors may be factored into projects, based on the context and relevance to the field projects selected.

PATTERN UNDERSTANDING AND BROAD SITE DESIGN DESIGN BASICS

- Mapping to scale and base map drawing.
- Sectors and zone planning
- Landform variables, topography introduction.
- Site survey and identification of resources.
- System thinking and elements of permaculture design.
- Patterns in nature and in permaculture design. Definition of permaculture and history around the world and in India. Permaculture principles and need for the ethics in today's context. Applied permaculture in Indian context.

IMPROVING SOIL FERTILITY- USING PROBIOTICS TO BUILD SOIL MICROBIOLOGY, COMPOST AND METHODS, MULCHING METHODS, ZERO TILL NO TILL AGRICULTURE

- Soil types and fertility analysis.
- Increasing soil fertility: composting, mulching, and other methods.
- Nutrient management, jeevamrutham / panchagavya preparation, how to prepare compost for soil using organic waste
- Erosion control/ cover cropping.

WATER

- Water cycle and other sources.
- Water management - Mapping of water resources, rooftop /other water harvesting-structures and earthworks, drip systems, and other management sources.

- Grey and black water recycling system.
- Waste management.

FARM INFRASTRUCTURES AND FARM HOME GARDEN

- Fence and fence planting.
- House on farm.
- Cattle shed and chicken house.
- Energy sources and storage: bore well, solar pump structures, biogas, solar panel.
- Compost toilet, rocket stove and pot fridge.
- Dry / wetland gardens and garden layout: different types of raised/ sunken beds: circles, key-holes.

URBAN ORCHARDS, FARM FORESTRY AND FOOD CROPS

- Agro-forestry and forest gardening: guilds, living fences, windbreaks, fire control, biomass trees, medicinal trees.
- Organic food production: grain and other crops (cereals, pulses, oil, vegetables, others).
- Seed conservation, seed preservation and nursery work.
- Soil preparation, cropping patterns and companion planting.
- Food forest
- Vegetable gardening
- Ecological pest management, beneficial insects and pollinators
- Storage of crops and management of post-harvest

APPLYING PERMACULTURE PRINCIPLES TO URBAN AGRICULTURE, HOLMEGRENS 12 PRINCIPLES OF PERMACULTURE, PERMACULTURE REGENERATIVE AGRICULTURE

- Lessons from community teachers
- Importance of seed
- Building biodiversity
- Cropping patterns
- Plant propagation techniques

ANIMAL INTEGRATION AND SYSTEMS

- Indian cattle and their care, poultry, goat and sheep integration on farm.
- Bees, their uses, and integration on farm.
- Pasture and food needs for animals and basic animal care

COMMUNITY INTERACTION AND STRATEGIES

- Urban and rural inter links.
- Marketing and connections to customers.

Adoption of best practices for urban farming-

1. Precautions to be taken while selecting site for UF
2. Crop selection
3. Pots & potting mixtures/rooting material
4. Seeds availability centres for UF
5. Seed treatment

6. Seed sowing and nursery
7. Irrigation
8. Nutrient management, Jeevamrutham / Panchagavya preparation, how to prepare compost for soil
9. Pest management, preparation procedures for bio liquids and neemastam
10. Harvesting and yield
11. Tools and implements
12. Technologies and innovations in UF.
13. Sources of information for UF.
14. Success stories of urban farmers in Hyderabad
15. Field reports and recommendations
16. Some of glimpses of training programmes on UF.

References:

- Project report on Urban farming/Terrace gardening -Awareness,Dissemination and Adoption by best practices:Submitted to National Institute of Agricultural Extension Management(MANAGE,Hyd)-ICAR-IIHR,Varanasi by G.Madhusudan,ADH,retd
- Bill Mollison_ Reny Mia Slay - Introduction to Permaculture-Tagari Publications (1997)
- Bill Mollison - Permaculture Design Course
- Bill Mollison - Permaculture_ A Designers' Manual-Tagari Publications (1997)
- Caleb Warnock - Growing a Permaculture Food Forest_ How to Create a Garden Ecosystem You Only Plant Once But Can Harvest for Years-Familius (2017)
- Aranya - Permaculture design_ a step-by-step guide-Distributed in the USA by Chelsea Green Publishing, Permanent Publications (2015)
- Ross Mars - The Basics of Permaculture Design -Permanent Publications (2005)
- Carpenter, Novella - Farm city_ the education of an urban farmer-Penguin USA, Inc. (2014)
- Carpenter, Novella_Rosenthal, Willow - The Essential Urban Farmer-Penguin Publishing Group (2012)
- Curtis Allen Stone - The Urban Farmer_ Growing Food for Profit on Leased and Borrowed Land-New Society Publishers (2015)
- Luke Potter - THE COMPLETE GUIDE TO HOUSEPLANTS_ Indoor Gardening Book for Beginners (The Urban Farmer Series 4)-Luke Potter Publishing Co. (2022)
- Luke Potter - How To Grow Vegetables In Pots & Containers_ 9 Steps to Plant & Harvest Organic Food in as Little as 21 Days for Beginners (The Urban Farmer Series Book 2)-Luke Potter Publishing Co.
- Toby Hemenway, John Todd - Gaia's Garden_ A Guide to Home-Scale Permaculture-Chelsea Green (2001)
- Nicole Faires - The Ultimate Guide to Natural Farming and Sustainable Living_ Permaculture for Beginners-Skyhorse (2016)

You-tube videos by :

- Morag Gamble : Our Permaculture Life
- The Gardening Channel with James Prigioni
- Ayala Water and ecology - Eli Cohen

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