



# Nature Science Foundation

[ISO/IEC 17020:2012 Accredited Type 'A' Inspection Body by NABCB,  
QCI, Ministry of Commerce & Industry, Govt. of India]

Coimbatore, Tamil Nadu, India.

## Certificate & Lead Auditor Courses on

1. Green Skill Development
2. Environment Sustainability Audits
3. Carbon Auditing, Sequestration and Neutralization
4. AI Technology in Environment Sustainability Audits
5. Gardening Techniques and Landscape Design
6. Lead Auditor, Consultant & Technical Experts Course

**Students Eligibility :** Arts, Science, Engineering & Technology Students

**Duration :** 30 hours (Theory: 20 hours, Hands-on-training: 10 hours)

**Credits:** Two

**Course fee :** As per the Norms

### Teaching Modules:

**Module I :** On-Board, PPT, Assignments, Tutorials, Industrial Visits  
Field Trips, Group Discussions and Quiz.

**Module II :** Experimental Demo ( $\text{CO}_2$  ,  $\text{O}_2$  , Noise , Light intensity,  
Voltage, pH & TDS Meters) and Practicals (air, water and soil quality).

**Course Materials :** PPTs, Handouts, Notes and Books.

**Evaluation Methods:** Assignments, Seminars and Examinations.

**Course Completion :** Certificates and Testimonials

### Course Outcomes:

1. Developing skills to make green campus with pure atmosphere.
2. Creating the students mindset towards start-up companies.
3. Become an Auditor, Consultant, Technical Expert & Entrepreneur.

# Syllabus of Certificate Course on “Green Skill Development”

## Course Aim:

Support the students to develop their Entrepreneurship skills and doing Bio-business in the sustainable environment by following Intellectual Property Rights, Patent Policies, Technology transfer methods.

## Learning Objectives

- To enable the students to understand the sources of innovation opportunities and development of the skills to identify and analyze these opportunities for entrepreneurship and innovation.
- To develop personal skills set for creativity, innovation and entrepreneurship and specific concepts and tools for combining and managing creativity in organization.

## Course Outcomes

1. Developing the students for creativity and responsibility on skills making green campus to provide pure atmosphere to the stakeholders.
2. Making the students to understand various biotechniques and marketing of bioproducts for commercial exploitation.
3. Creating the students mindset towards start-up companies by using natural products and learning about bioethics issues in developing and marketing.
4. Learning about the entrepreneurial skills to develop the business strategy and technology transfer for various ventures.

## Unit I: Introduction to green skill development

[6 hours]

What are green skills?, Importance of Green Skill Development Programme, Financial or social constraints in green skill development, Green skilled workforce, Presentation, Communication, Listening, Interpersonal, Technical Writing, Computing, Research skills, Information, abilities, values and attitudes of green skills, National building code, IGBC, BEE, ASSOCEM.

## Unit II: Gardening and Hydroponics Techniques

[6 hours]

Nursery development, Greenhouse and Glass house methods, Types of gardening, Terrace, Vertical, Kitchen, Zodiac, herbal and desert, Water Irrigation system, Soil analysis, Natural topography, Landscape design, Soil erosion control, Rain harvesting system, Hydroponics technology, Drip Irrigation and Fertigation System.

**Unit III: Entrepreneurship skills [6 hours]**

Entrepreneurship, Bioentrepreneurship, Biobusiness, Production of mushrooms, Single cell protein, Production of Organic manures, Biofertilizers, Biopesticides, Vermicompost and Panchagavya, Aquarium development, Biogas, Bakery, Confectionary and Dairy products, Production of Areca plates, Bamboo basket, Paper Plates and Cups making.

**Unit IV : Green Audit Techniques and Implementation [6 hours]**

Introduction to green campus audit, Audit procedures and target areas of green auditing, Flora and Fauna diversity, Natural topography, Vegetation, Landscape design, Soil erosion control, Pedestrian Path, Rain harvesting system, Different types of Gardening, Water Irrigation system.

**Unit V: Environment Sustainability Audits, ISO and IPR Policies [6 hours]**

Introduction to green, environment, energy, hygiene, air, soil, water and waste management audits. Auditing techniques and implementation procedures, Commercialization, Business plan, Bank loan and Finance strategy, Marketing skills, International Standards (ISO 14001:2015, 50001:2018 and 17020:2012), Intellectual Property Rights (IPR), Patent Policies, Technology transfer.

**Total Lectures / Demo / Practicals / Case studies / Auditing Hours [30 hours]**

**Text Books:**

1. Jogdand, S.N. 2007. Entrepreneurship and Business of Biotechnology, Himalaya Publishing House, Nagpur, Maharashtra.
2. Rajeev Yoy, 2011. Entrepreneurship, 2nd edition, Oxford Publications, London, UK.
3. Karthikeyan, S. and Arthur Ruf, 2009. Biobusiness. MJP Publications, Chennai, India.
4. Gnanamangai, B.M., Murugananth, G. and Rajalakshmi, S. 2021. *A Manual on Environment Management Audits to Educational Institutions and Industrial Sectors*. Laser Park Publishing House, Coimbatore, Tamil Nadu, India.

**Reference Books:**

1. Oliver, R. 2000. The coming biotech age: The business of biomaterials, McGraw Hill, New York, US.
2. Shaleesha, S. 2008. Bioethics, Wisdom educational service, Chennai, India.
3. Ruth Ellen Bulger. 1993. The ethical dimensions of the Biological sciences, Cambridge University Press, New York, US.
4. Gurinder Shahi, 2004. BioBusiness in Asia: How countries Can Capitalize on the

# Syllabus of Certificate Course on “Environment Sustainability Audits”

## **Course Aim:**

Support the Educational Institutions, Industries and Public sectors to implement ‘Environment Sustainability Audits’ to provide an ecofriendly atmosphere to the stakeholders.

## **Learning Objectives:**

The students and staff members enable to

- Understand the principles and importance of various audits in the context of the organization and risk assessment to Educational Institutions, Industries and Public sectors.
- Study the concept on how to conduct Green, Environment, Energy, Waste Management, Hygiene, Water, Soil and Air quality audits’ at 360° view?.
- Become the Lead Auditors, Technical Experts, Free Lancers and Entrepreneurs in the field Environment Sustainability Audits to provide solution for environmental problems.

## **Course Outcomes:**

1. Development of basic understanding on Environment Management System and overview of International Standards on ISO 14001:2015, 45001:2018, 50001:2018 and 17020:2012.
2. Understand the audits groundwork, checklist preparation, practical auditing and auditing techniques, Audit/Non-conformity report preparation and submission.
3. Analyze how to help the Educational Institutions Industries and Public sectors to maintain the ecofriendly environment campus and personal hygiene to stakeholders.
4. Study the methods of disposal, ways to reduce the wastes through carbon footprint, sequestration and neutralization methods to solve the environmental problems
5. In what way the audit process supports the nation for the noble cause of environmental protection and nature conservation to enhance the quality of life to human beings.

## **Unit I: Green Audit Techniques and Implementation**

**[6 hours]**

Introduction to green campus audit, Audit procedures and target areas of green auditing, Flora and Fauna diversity, Natural topography, Vegetation, Landscape design, Soil erosion control, Pedestrian Path, Rain harvesting system, Different types of Gardening, Water Irrigation system.

## **Unit II: Environment Audit Techniques and Implementation**

**[6 hours]**

Environment friendly campus, Audit procedures and target areas of environment auditing, Carbon Footprint, Public transport, Low emitting vehicles and control of car smokes and exhausts, Recycling of wastes and wastewaters, Methods of wastes disposal, Biogas plant, Vermicompost.

**Unit III: Energy Audit Techniques and Implementation****[6 hours]**

Energy Conservation Acts, Energy conservation building code, Objectives of energy audit, Energy auditing procedure, Instruments used for an energy audit, Renewable energy utilization, Energy conservation and saving opportunities, Solar panels & Water heaters. Carbo audit, Carbon sequestration and neutralization, Carbon footprint.

**Unit IV: Fire & Life safety, Hygiene, Soil, Air and Water Audits****[6 hours]**

Personal and environmental hygiene, water, Audit Procedures, Safety Rules for a hygiene Environment, Water, air and soil quality analysis. Use of O<sub>2</sub>, CO<sub>2</sub>, Light intensity, Sound level, Voltage, pH, TDS Meters, Salinity and Alkalinity Instruments in sample analysis, Fire safety audit and Life safety audits.

**Unit V: Waste Management Audit and ISO Procedures****[6 hours]**

Different types of Wastes, Plastic, Biomedical, Electronic, Construction & demolition wastes, Industrial wastes, Method of disposal, segregation and recycling methods, Wastewater treatment, Techniques and Implementation of waste management audits. International Standards on ISO 14001:2015, 45001:2018, 50001:2018 and 17020:2012.

**Total Lectures / Demo / Case studies / Audited site visits Hours****[30 hours]****Text Books:**

1. Gnanamangai, B.M., Muruganath, G. and Rajalakshmi, S. 2021. *A Manual on Environment Management Audits to Educational Institutions and Industrial Sectors*. Laser Park Publishing House, Coimbatore, Tamil Nadu, India.
2. Rajalakshmi, S., Kavitha, G. and Vinoth kumar, D. 2021. *Energy and Environment Management Audits*. AkiNik Publishing, New Delhi, India.
3. Pramanik, A.K. 2013. *Environmental Audit and Indian Scenario, Environmental Accounting and Reporting*. Deep and Deep Publications, New Delhi, India.
4. Rajalakshmi, S., Amzad Basha, K. and Asif Jamal, G.A. 2023. *A Manual on Waste Management Audit*. Laser Park Publishing House, Coimbatore, Tamil Nadu, India.

**Reference Books:**

1. Leal Filho, W., Muthu, N., Edwin, G. and Sima, M. 2015. *Implementing campus greening initiatives: approaches, methods and perspectives*. Springer, London, UK.
2. Roethlisberger, F.J. and Dickson, W.J. 2017. *Hygiene Management and its Implementation*. Harvard University Press. Cambridge, UK.
3. Thompson, D. 2018. *Tools for Environmental Management*. New Society Publishers, Gabriola Island, BC.

# Syllabus of Certificate Course on “Carbon Auditing, Sequestration and Neutralization”

## **Course Aim:**

This course aims to help the interested students, staff and general public to identify where to focus carbon emissions reduction efforts, develop a strategy and track the impact of emissions reduction initiatives.

## **Learning Objectives:**

The students and staff members enable to

1. Develop their employability skills as a Carbon Auditor.
2. Step forward to reduce the alarming impact due to carbon emission
3. Carbon capture and accounting
4. Be a milestone to reduce the carbon emission

## **Course Outcomes:**

The participants will be able to

1. Learn the basics of carbon and its impacts on the environment.
2. Advancements in carbon trading and sequestration in soil ecosystem
3. Know the ways to reduce carbon emission from various sources and neutralization.
4. Learn about GHG in line with International Standards for carbon neutralization.
5. Be a trained carbon auditor to measure, analyze and report on GHG emission produced by an individual, organization or event.

## **Unit I: Introduction to Carbon**

**[6 hours]**

Introduction, Types of elements, Characteristics and its properties, Carbon allotrope with examples, Uses of carbon and its compounds, Carbon footprint, Carbons role in current affairs, Advantages and Disadvantages, Principles of carbon cycles and climate change.

## **Unit II: Carbon Sequestration, Accounting and Trading**

**[6 hours]**

Green, Blue and Brown Carbon. About storage in ecosystem, Role in mitigation, Vulnerability, Importance and Global policy initiatives. Carbon sequestration and climate change mitigation, carbon capture and storage, challenges and limitations of carbon sequestration, the future of carbon sequestration.

## **Unit III: Carbon Accounting and Trading**

**[6 hours]**

Carbon accounting overviews, importance, Five Principles, Accounting for suppliers' emission, Calculating emissions, challenges. Concepts of carbon trading, types, regional carbon trading markets, Carbon trading post Glasgow COP26, Advantages and Disadvantages, Techniques for carbon sequestration, carbon neutralization, and offsetting.

## **Unit IV: Green House Gas Emission and International Standards [6 hours]**

ISO 14064-1:2018, ISO 14064-2:2019 and ISO 14064-3:2019 – Green House Emission Standards, ISO 14067:2018 – Green House Gases – Carbon foot print of products – Requirement and Guidelines for Quantification and Applying tools and methods for carbon accounting and reporting in line with International standards.

## **Unit V: Policies for Carbon Management [6 hours]**

Role of carbon in the global economy and its impact on business strategies, Regulatory frameworks and policies related to carbon management, importance and scope of carbon audit, checklist, Measurement, Management and reduction of carbon emission in various sectors and events.

**Case Studies:** Site visit and groundwork, checklist preparation, conformity and non-conformity report preparation, Recommendations and suggestions after audit to the auditees.

**Total Lectures / Demonstrations / Case studies / Audited site visits Hours [30 hours]**

### **Text Books:**

1. Shelley W. W. Zhou, Carbon Management for a Sustainable Environment, 2020, Springer International Publishing
2. A protocol for measurement, monitoring, reporting and verification of soil organic carbon in agricultural landscapes (FAO)  
<https://www.fao.org/documents/card/en/c/cb0509en/>
3. The Carbon Footprint Handbook" by Ian Martin and Paul McKeigue
4. Climate Change and Carbon Markets: A Handbook of Emissions Reduction Mechanisms" by Farhana Yamin and Jørgen Wettestad
5. Clean Development Mechanism: A User's Guide" by The World Bank
6. The Handbook of Carbon Offset Programs: Trading Systems, Funds, Protocols and Standards" edited by Anja Kollmuss, Michael Lazarus and Carrie Lee

### **Reference Books:**

1. 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Intergovernmental Panel on Climate Change, 2006.
2. Carbon Markets 101: A Handbook" by Rupesh Madlani and Nick Robins
3. Carbon Finance: The Financial Implications of Climate Change" by Sonia Labatt and Rodney R. White
4. Carbon Offsetting and Reduction Scheme for International Aviation (CORSA)" by the International Civil Aviation Organization (ICAO)
5. Achieving net zero, Farming's 2040 Goal (National Farmers Union)  
<https://www.nfuonline.com/media/jq1b2nx5/achieving-net-zero-farming-s-2040-goal.pdf>

# **Syllabus of Certificate Course on 'AI Technology in Environment Sustainability Audits'**

## **Course Aim:**

The course aims to explore the intersection of emerging AI technologies in environment sustainability audits, emphasizing how AI can address environmental challenges.

## **Learning Objectives:**

The students and staff members enable to

1. Understand the principles and importance of AI technologies by fosters critical thinking on ethical implications and innovative solutions for a greener future.
2. Study the concept on how AI's role in promoting environment sustainable practices?.
3. Become a Lead Auditor, Consultant and Entrepreneur in the field of Green, Energy and Environment Audits to provide solution for environmental problems using AI technologies.

## **Course Outcomes:**

- Gain a deep understanding of how AI technologies can be applied to solve environment sustainability challenges.
- Demonstrate the ability to assess and implement AI solutions with a strong awareness of ethical considerations and societal impacts.
- Acquire the technical skills to design, develop, and deploy AI-driven solutions that enhance environment sustainability impacts.
- Develop the effectiveness of AI applications in environment sustainability in identifying areas for improvement and innovation.
- Build the integrating AI expertise with environmental science, policy, and business strategies to promote sustainable development.

## **Unit I: Introduction to Environment sustainability audits**

**[6 hours]**

Introduction to environment sustainability, Scope and Importance, Types of audits: Green, Environment, Energy, Waste Management, Soil, Water, Air Quality, Hygiene, Fire Safety, Life Safety and Carbon audits, Audit process, methodology and report writing.

## **Unit II: Environment sustainable parameters of audits [6 hours]**

Understanding the concepts of natural topography, vegetation and monitoring, Landscape design and soil erosion control, Gardening types, Green building conservation code, Measurement of oxygen, carbon di oxide, light intensity, sound level and voltage. Carbon emission from Public transport, low emitting vehicles and control of car smokes.

## **Unit III: Energy Conservation Acts and testing tools [6 hours]**

Energy Conservation Acts, Energy conservation and saving opportunities, Renewable and Non-renewable energy utilization, Energy Consumption Forecasting and Smart Grid Management, Vehicle emission testing tools, Fuel emission analyzers, Energy modelling software.

## **Unit IV: AI Tools & Technologies in Environment Sustainability Audits [6 hours]**

Introduction of Artificial Intelligence, Development of software for green, environment and energy audits, Detection devices, Building information modelling software, Green building rating system, Building Life cycle assessment software, AI in Water management and quality monitoring, AI in Air quality monitoring, Geographic Information System (GIS), Drone based technology in green campus.

## **Unit V: ICT and IoT approaches in environment Sustainability Audits [6 hours]**

AI-driven solutions for environment sustainable development goals (SDGs), Ethical considerations in applying AI to environment sustainability; ICT tools for data collection and analysis, IoT (Internet of Things), Big data analytics and Cloud computing; Machine Learning technique in energy efficiency, Image processing techniques in flora and fauna, Biodiversity Conservation Web-Portal.

### **Text Books:**

1. Gnanamangai, B.M., Muruganath, G. and Rajalakshmi, S. 2021. *A Manual on Environment Management Audits* Laser Park Publishing House, Coimbatore.
2. Rajalakshmi, S., Kavitha, G. and Vinoth kumar, D. 2021. *Energy and Environment Management Audits*. AkiNik Publishing, New Delhi, India.
3. Pradhan, M. 2022. *Fundamentals of Artificial Intelligence and Machine Learning*. DPS Publishing House, New Delhi.

### **Reference Books:**

1. Wolfgang Ertel, 2018. *Introduction to Artificial Intelligence*. Second Edition, Springer, The Netherlands.
2. Russell, S. and Norvig, P. 2024. *Artificial Intelligence: A Modern Approach*. Pearson, Global edition, London, UK.

# Syllabus of Certificate Course on “Gardening Techniques and Landscape Design”

## **Course Aim:**

This course aims to help the interested students, staff and general public to develop their skills in the “Gardening Techniques and Landscape Design” to establish different types of gardens and design landscape for building construction to maintain the microclimate without disturbing the vegetation.

## **Learning Objectives:**

The students and staff members enable to

- Develop their employability skills in gardening and landscaping techniques.
- Make them better prepared to meet the local demands as well as develop their own interests and aptitudes.
- Produce skilled personnel in gardening and landscaping techniques,
- Familiarize with various plants, seeds, fertilizers, pesticides, tools and equipment used in the gardening and landscaping

## **Course Outcomes:**

It is a skill development programme. So, the participants will be able to

1. Learn the basics of gardening and maintenance of plants, growth, and their uses
2. Familiarize with various ornamental, medicinal and aromatic plants species for commercial exploitation
3. Perform the various grafting techniques, nursery development and management in the field
4. Learn about various designs and types of gardens and know how the landscaping is designed based on the topography
5. Design the gardens innovatively based on the landscape pattern and they are confident enough to start their own business in gardening and landscaping.

## **Unit I: Introduction to Gardening and Establishment methods [6 hours]**

Nature of gardening, historical background, principles of gardening, components, lawn making, glass house, green house, rockery, water garden, hydroponics and aeroponics. Soil mixtures and seed beds, water, media and nutrition requirement for garden crops, fertilizer requirement, irrigation methods, gardening tools, selection and management of the garden equipment.

## **Unit II: Types of plants, gardens and various designs [6 hours]**

Planting scheme of garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement and management. Layout of the different gardens and their designs, herbal garden, terrace garden, vertical garden, kitchen garden, zodiac garden, ornamental garden, desert garden, indoor garden, and public garden.

**Unit III: Nursery development and other management practices [6 hours]**

Plant nursery bed preparation, nursery layout, raising seedlings, cuttings, grafting, budding and layering techniques and root stock preparation, nursery management and transplantation of the seedlings, nutrients, water, weed, pest and disease management.

**Unit IV: Role of vegetation in landscape design [6 hours]**

Importance and scope of landscaping, landscaping of urban and rural areas, Peri-urban landscaping, Landscaping of academic institutions (schools, colleges and universities), commercial buildings, apartments/flats and public places. Importance and scope of ornamental crops, medicinal and aromatic plants. Role of vegetation in landscape design, selection of plant species for landscape, plants and indoor air quality, process of planting and transplanting, landscaped parking, climate and vegetation.

**Unit V: Green building environment and landscaping in India [6 hours]**

Forest and vegetation types in Indian climatic conditions, recommended plant species for sustainable landscaping. Landscape design concepts, appropriate rainwater harvesting system, Landscape designs and suitable plant species, Persian gardens, British gardens in India, Organic gardening basics, Ecotourism impact, planning and development.

**Total Lectures / Demonstrations / Case studies / Audited site visits Hours [30 hours]**

**Text Books:**

1. Vinoth Kumar, D., Rajalakshmi, S., and Sri Santhya, V. 2023. Techniques in Gardening. Laser Park Publishing House, Coimbatore, Tamil Nadu, India. 70 pages.
2. Kaushal Kumar Misra, 2011. Ornamental gardening in India. Biotech Books. 349 pages.
3. A handbook of Landscape – A Guide. 2013. Central Public Works Department. New Delhi. 154 pages.

**Reference Books:**

1. Gopaldaswami Iyengar K.S., 1970, Complete Gardening in India, Kalyan Press, Bangalore.
2. Pratibha P Trivedi 1987. Home Gardening. Indian Council of Agricultural Research ICAR. 340 pages.
3. Gardening - Step by Step Guide to Growing Natural Herbs and Remedies in Your Back Yard: (Gardening, Gardening for Beginners, Organic Garden, Perennial Vegetables, Home Garden, Horticulture)

# Syllabus of Lead Auditor, Consultant, Technical Experts Course on “Environment Sustainability Audits”

## Course Aim:

Support the Educational Institutions, Industries and Public sectors to implement ‘Environment Sustainability Audits’ to provide an ecofriendly atmosphere to the stakeholders as per the National Building Code Part II: Approach to Sustainability.

## Learning Objectives:

The Learners enable to

1. Understand the principles and importance of various audits in the context of the organization and risk assessment to Educational Institutions, Industries and Public sectors.
2. Study the concept on how to conduct Green, Environment, Energy, Waste Management, Hygiene, Carbon, Fire & Life safety, Water, Soil and Air quality audits at 360° view?.
3. Become the Lead Auditors, Technical Experts, Freelancers and Entrepreneurs in the field ‘Environment Sustainability Audits’ to provide solution for environmental problems.

## Course Outcomes:

1. Development of basic understanding on Environment Management System and overview of International Standards on ISO 14001:2015, 45001:2018, 50001:2018 and 17020:2012.
2. Understand the audits groundwork, checklist preparation, practical auditing and auditing techniques, audit/non-conformity report preparation and submission.
3. Analyze how to help the Educational Institutions, Industries and Public sectors to maintain the ecofriendly environment campus and personal hygiene to various stakeholders.
4. Study the methods of disposal, ways to reduce the wastes through carbon footprint, sequestration and neutralization methods to solve the environmental problems.
5. In what way the audit process supports the nation for the noble cause of environmental protection and nature conservation to enhance the quality of life to human beings.

## Unit I: Introduction to Auditing Techniques and Implementation [6 hours]

Environment friendly campus, Green initiatives, Introduction to various audits, Types of audits, Audit procedures, Target areas of auditing, National Building Code, Part II: Approach to Sustainability, Audit process, Methodology, Checklist preparation, Report writing, Conformity and non-conformity.

## Unit II: Green & Environment Audit Techniques and Implementation [6 hours]

Audit procedures and target areas of green and environment auditing, Public transport & Low emitting vehicles, Recycling of wastes and wastewaters, Biogas plant, Vermicompost, Natural topography, Vegetation, Landscape design, Soil erosion control, Rain harvesting system, Water Irrigation system.

**Unit III: Energy and Carbon Audit Techniques and Implementation [6 hours]**

Energy Conservation Acts, Energy conservation building code, Energy conservation and saving opportunities, Solar panels & Water heaters, Carbon audit, Carbon Footprint, Carbon sequestration & neutralization, Energy and carbon auditing procedure, Instruments used for the audits,.

**Unit IV: Hygiene, Soil, Air and Water Audits [6 hours]**

Personal and environmental hygiene, water, Audit Procedures, Safety Rules for a hygiene Environment, Water, air and soil quality analysis. Air quality assessment, Use of O<sub>2</sub>, CO<sub>2</sub>, Light intensity, Sound level, Voltage, pH, TDS Meters, Salinity and Alkalinity Instruments in sample analysis.

**Unit V: Fire & Life Safety, Waste Management Audit and ISO Procedures [6 hours]**

Different types of Wastes, Plastic, Biomedical, Electronic, Construction & demolition wastes, Industrial wastes, Method of disposal, segregation and recycling methods, Wastewater treatment, Techniques, Implementation of waste management audits. International Standards on ISO 14001:2015, 45001:2018, 50001:2018 and 17020:2012 for auditing.

**Total Lectures / Demo / Case studies / Audited site visits Hours [30 hours]**

**Text Books:**

1. Gnanamangai, B.M., Murugananth, G. and Rajalakshmi, S. 2021. *A Manual on Environment Management Audits to Educational Institutions and Industrial Sectors*. Laser Park Publishing House, Coimbatore, Tamil Nadu, India.
2. Rajalakshmi, S., Kavitha, G. and Vinoth kumar, D. 2021. *Energy and Environment Management Audits*. AkiNik Publishing, New Delhi, India.
3. Pramanik, A.K. 2013. *Environmental Audit and Indian Scenario, Environmental Accounting and Reporting*. Deep and Deep Publications, New Delhi, India.
4. Rajalakshmi, S., Amzad Basha, K. and Asif Jamal, G.A. 2023. *A Manual on Waste Management Audit*. Laser Park Publishing House, Coimbatore, Tamil Nadu, India.

**Reference Books:**

1. Leal Filho, W., Muthu, N., Edwin, G. and Sima, M. 2015. *Implementing campus greening initiatives: approaches, methods and perspectives*. Springer, London, UK.
2. Roethlisberger, F.J. and Dickson, W.J. 2017. *Hygiene Management and its Implementation*. Harvard University Press. Cambridge, UK.
3. Thompson, D. 2018. *Tools for Environmental Management*. New Society Publishers, Gabriola Island, BC.