

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	23UBOVAC1	VAC - I			---	100	100
<b>Course Title</b>		<b>Poly House and Shade Net House Farming</b>					

SYLLABUS		
Unit	Contents	Hours
I	Protected cultivation – history, objectives and importance. Types of protection. Planning of poly house facility. Classification of poly house.	6
II	Plant response to poly house environment – light, temperature, humidity, ventilation and Carbon dioxide.	6
III	Climate control inside the poly house – manual controlling, thermostats, active summer and winter cooling system and carbon dioxide enrichment method.	6
IV	Irrigation – drip irrigation, overhead irrigation. Manures – farmyard manures, NPK fertilizers and Bio fertilizers. Pest and disease control measures.	6
V	Harvest and post-harvest technology of floral plants and green leafy vegetables – gerbera, rose, tomato, cucumber and spinach.	6

<b>Text Book(s):</b>
<ol style="list-style-type: none"> <li>1. Manohar KR, Greenhouse technology and management, B.S. Publishers Pvt Ltd, New Delhi, India 2<sup>nd</sup> Edition, 2007.</li> <li>2. Sheela VL. Horticulture, MJP Publishers, Chennai, India, 1<sup>st</sup> Edition, 2011.</li> <li>3. Patil NN, Greenhouse Technology – Management, operations and Maintenance, Universal Prakashan Pvt Ltd, Pune, India, 1<sup>st</sup> Edition, 2016.</li> </ol>
<b>Reference Book(s):</b>
<ol style="list-style-type: none"> <li>1. Tiwari GN, Greenhouse for controlled environment, Alpha Science International Pvt Ltd, United Kingdom, 1<sup>st</sup> Edition, 2003.</li> <li>2. Nicolas C and Esteban JB, Greenhouse Technology and Management, CAB International Publishers, United Kingdom, 2<sup>nd</sup> Edition, 2013.</li> <li>3. Shakeel Ahmad B, Tawheed A, Omar B and ShafatAhmadK, Greenhouse Technology for Sustainable Agriculture, CRC Publishers, Taylr and Francis Group, USA, 2023.</li> </ol>
<b>Web Resource(s):</b>
<ol style="list-style-type: none"> <li>1. <a href="https://www.youtube.com/watch?v=p1S0uzAncdU">https://www.youtube.com/watch?v=p1S0uzAncdU</a></li> <li>2. <a href="https://agricultureguruji.com/greenhouse-farming/">https://agricultureguruji.com/greenhouse-farming/</a></li> <li>3. <a href="https://agritech.tnau.ac.in/horticulture/horti_Greenhouse%20cultivation.html">https://agritech.tnau.ac.in/horticulture/horti_Greenhouse%20cultivation.html</a></li> </ol>

<b>Course Outcomes</b>		
Upon successful completion of this course, the student will be able to:		
<b>CO No.</b>	<b>CO Statement</b>	<b>Cognitive Level (K-Level)</b>
<b>CO1</b>	Differentiate different types of protected structures for crop cultivation	<b>K2</b>
<b>CO2</b>	Survey and manage of poly house farming as a small agri business enterprise	<b>K4</b>
<b>CO3</b>	Summarize the cultivation practices of horticulture crops grown under protected structures	<b>K5</b>
<b>CO4</b>	Understand the support would get from banks and services available from insurance	<b>K2</b>
<b>CO5</b>	Develop the importance of self-employment and confidence level.	<b>K3</b>

**Course Coordinator: Dr. N. Ahamed Sherif**

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
V	23UBOVAC2	VAC – II				100	100
<b>Course Title</b>		<b>Green Skill Development</b>					

SYLLABUS		
Unit	Contents	Hours
I	<b>Unit I: Introduction to greens kill development:</b> Introduction and Importance of Green Skill Development Programme, Financial or social constraints in green skill development, Green skilled workforce, Information, abilities, values and attitudes of green skill.	6 Hours
II	<b>Unit II: Introduction to plant and organic green skill development:</b> Plant breeding techniques, Nursery development, Types of gardening, Water irrigation system, Use of biofertilizers, vermicompost, production of Organic manures.	6 Hours
III	<b>Unit III: Introduction and Importance of Green campus Audit:</b> Introduction and green campus audit procedures, Target areas of green auditing, Forest and planted Vegetation, Acoustic proof in Indoor and Outdoor Stadiums, Recommendations for greening the campus.	6 Hours
IV	<b>Unit IV: Introduction and Importance of Environment Audit:</b> Environmental Management System, Environment audit procedures and target areas of environment auditing, Benefits, phases and components of environmental audit, Recycling of solid waste sand waste waters, Plastics and E-wastes.	6 Hours
V	<b>Unit V: Case studies, Auditing Techniques and Audit Report Preparation:</b> Case studies, Seminars, Assignment, Tutorials and Auditing exercises, Audited site visits checklist preparation, Audit report preparation, Recommendations and suggestions after audit to the audits.	6 Hours
VI	<b>Current Trends *(For CIA only) – Total Lectures/ Demonstrations/Casestudies/Audited sitevisits Hours</b>	

\* For Theory Core Course, wherever possible

<b>Text Book(s):</b>
<ol style="list-style-type: none"> <li>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.</li> <li>2. Ponmurugan, P., Deepa, M.A. and Shreeram B. 2022. Green skill development. New Age International Publishing, New Delhi. (In Press).</li> <li>3. Rajalakshmi, S., Kavitha, G. and Vinoth kumar, D. 2021. Energy and Environment Management Audits. Aki Nik Publishing, New Delhi, India.</li> </ol>
<b>Reference Book(s):</b>
<ol style="list-style-type: none"> <li>1. Cardozo, N.H., da Silveira Barros, S.R., Quelhas, O.L.G., Filho, E.R.M. and Salles, W.2019. Benchmarks analysis of the higher education institutions participants of the Green Metric World University Ranking. Springer, Universities and Sustainable Communities: Meeting the Goals of the Agenda 2030, World Sustainability Series.</li> <li>2. Leal Filho, W., Muthu, N., Edwin,G. and Sima,M. 2015. <i>Implementing campus green in initiatives: approaches, methods and perspectives</i>. Springer, London, UK.</li> <li>3. Pramanik, A.K.2013.<i>Environmental Audit and Indian Scenario, Environmental Accounting and Reporting</i>. Deep and Deep Publications, New Delhi, India.</li> </ol>

<b>Web Resource(s):</b>
1.
2.
3.

<b>Course Outcomes</b>		
Upon successful completion of this course, the student will be able to:		
<b>CO No.</b>	<b>CO Statement</b>	<b>Cognitive Level (K-Level)</b>
CO1	Develop green skilled workers having technical knowledge and commitment to sustainable development, which will help in the attainment of making India into greenish.	<b>K2&amp; K3</b>
CO2	Understand the audits ground work, checklist preparation, Practical auditing and auditing techniques, Audit/Non-conformity report preparation and submission.	<b>K3, K4 &amp; K5</b>
CO3	Illustrate about wild life conservation, nurseries, gardeningetc. With Department of atmosphere and Environment and Forests of the Central Governments a swell.	<b>K2 &amp; K3</b>
CO4	Categorize the methods of disposal, ways to reduce the carbon foot print and the importance of green campus and environment policy to solve the environmental problems.	<b>K4 &amp; K5</b>
CO5	Summarize the audit process supports then action for the noble cause of environmental protection and nature conservation to enhance the quality of life to human beings.	<b>K4 &amp; K5</b>

**Course Coordinator: Dr. K. Mohamed Rafi**

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	23PBOVAC-I	VAC - I				100	100
<b>Course Title</b>		<b>Green Energy Systems</b>					

SYLLABUS		
Unit	Contents	Hours
I	<b>Introduction:</b> Overview of conventional and renewable energy sources, Need and types of energy, Indian and international energy scenario of conventional and renewable energy sources. Energy for sustainable development.	6
II	<b>Solar energy:</b> Basics and concepts of solar energy, Non-concentrating solar collectors and concentrating solar collectors, Storage systems.	6
III	<b>Wind energy:</b> Wind power and its source, Energy from wind, Horizontal axis wind turbine, Vertical axis wind turbine, Power generation from wind energy.	6
IV	<b>Wave energy:</b> Wave energy collecting devices - shoreline and offshore devices, Potential of wave energy in India, the Indian wave energy programme, Problems associated with utilization of wave energy.	6
V	<b>Bioenergy:</b> Biomass types and characterization, Principles of bio-conversion, Anaerobic/aerobic digestion, Types of bio-gas digesters, Gas yield, Utilization for cooking, Bio fuels. Environmental friendly machining - Vegetable based cutting fluids, Alternate casting and joining techniques, Zero waste manufacturing.	6

<b>Text Book(s):</b>
1. Da-Rosa AV and Ordonez JC, Fundamentals of Renewable Energy Processes, Elsevier Academic Press, 4 <sup>th</sup> Edition, 2021.
2. Patel MR, Wind and Solar Power Systems- Design, Analysis and Operation, Taylor and Francis, 2 <sup>nd</sup> Edition, 2005.
3. Kanoglu M, Çengel YA and Cimbalá JM, Wave Energy- In Fundamentals and Applications of Renewable Energy, New York McGraw-Hill Education, 1 <sup>st</sup> Edition, 2020.
<b>Reference Book(s):</b>
1. Davim P, Green Manufacturing Processes and Systems, Springer Publication, 1 <sup>st</sup> Edition 2013.
2. Singh VK, Bangari N, Tiwari R, Dubey V, Bhoi A and Babu T, Green Energy Systems- Design, Modelling, Synthesis and Applications, Academic Press, 1 <sup>st</sup> Edition, 2022.
3. Mitra M and Nagchaudhuri A, Practices and Perspectives in Sustainable Bioenergy, Springer Publication, 2020.

**Web Resource(s):**

1. [https://onlinecourses.nptel.ac.in/noc22\\_ch27/preview](https://onlinecourses.nptel.ac.in/noc22_ch27/preview)
2. <https://nptel.ac.in/courses/108108078>
3. [https://www.vssut.ac.in/lecture\\_notes/lecture1428910296.pdf](https://www.vssut.ac.in/lecture_notes/lecture1428910296.pdf)

**Course Outcomes**

Upon successful completion of this course, the student will be able to:

<b>CO No.</b>	<b>CO Statement</b>	<b>Cognitive Level (K-Level)</b>
CO1	Classify the different energy sources and analyse their impact on environmental issues	K4
CO2	Summarize the importance of solar energy collection and storage	K5
CO3	Describe the wind energy and their uses	K5
CO4	Enable for building a small range of wind energy conversion system	K5
CO5	Recognize bioenergy sources and formulate green manufacturing systems	K6

**Course Coordinator: Dr. B. Baluguru**