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Kongunadu

College of Engineering & Technology
[Autonomous]

(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai,
Accredited by NBA(CSE,ECE,EEE & MECH),
Accredited by NAAC with B++ Grade, Recognized by UGC with 2(f) & 12(B) and ISO 9001:2015 Certified Institution)

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DEPARTMENT OF AGRICULTURAL ENGINEERING

AGRIROOT MAGAZINE

CONTENTS

- ABOUT THE DEPARTMENT
- PEO, PSO & PO
- TECHNICAL TOPIC
- PROJECT
- POETRY (BOTH TAMIL AND ENGLISH)
- DRAWINGS
- CRAFT WORK
- PHOTOGRAPHY
- AUTOCAD AND SKETCH UP DESIGN

About the department

The Department of Agricultural Engineering was established in the year 2021, offers a 4 years B.Tech – Agricultural Engineering course with an intake of 60 students. The department has well experienced and highly qualified faculty members, excellent infrastructure, ultra-modern buildings, well equipped laboratory facilities and career guidance. The department is established to develop professionals with the knowledge of modern farming, irrigation, farm mechanization, soil and water conservation, harvesting, renewable energy and crop production with IoT technology. The department is focusing on widening the practical knowledge of the students thus encouraging them to solve different practical difficulties land holdings. The practical knowledge gained by them during practical field work and industrial visit has been added advantage for new technology and innovations. The department leads in the transfer of agricultural engineering and technology education to the younger generation on the right path to fulfill the career in agriculture and allied sectors.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

❖ **PEO I :** Graduates shall become agricultural professionals with specialization in irrigation, farm equipments, post harvest and renewable energy along with automation.

❖ **PEO II :** Graduates shall able to design and develop optimistic products for the benefits of farmer and society.

❖ **PEO III :** Graduates shall have professional ethics, team spirit, life-long learning, adopt corporate culture, core values and leadership skills and communication skills.

PROGRAM SPECIFIC OUTCOMES (PSOs)

❖ **PSO 1 :** Professional skills: Students shall understand, analyze, design and develop agricultural equipments to meet the requirements of farmer and industry.

❖ **PSO 2 :** Competency: Students shall qualify at the State, National and International level competitive examination for employment, higher studies and research.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to :

1. Engineering Knowledge : Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

2. Problem analysis : Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4).

3. Design/development of solutions : Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5).

4. Conduct investigations of complex problems : Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).

5. Engineering tool usage : Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6).

6. The Engineer and The World : Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).

7. Ethics : Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

8. Individual and Collaborative Team work : Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

9. Communication : Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.

10. Project Management and Finance : Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

11. Life-Long Learning : Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8).

Quality Policy of the Institute

To strive continuously for producing the best result in terms of Knowledge, Self-Discipline and application of the Knowledge acquired.

TECHNICAL TOPIC

1. Nanotechnology Applications in Agriculture

Nanotechnology is a modern scientific advancement that can greatly improve agriculture by increasing crop productivity, improving food quality, and reducing damage to the environment. Nano-based materials are extremely small particles ranging from 1 to 100 nanometers in size and their special properties make them useful in many agricultural activities. In farming, nanotechnology is used in smart delivery systems, nano fertilizers, nano pesticides and nano sensors to support better plant growth and efficient use of resources. Nano fertilizers help plants absorb nutrients more effectively through slow and controlled release, which reduces fertilizer loss and prevents overuse. In the same way, nano pesticides protect crops from pests and diseases while lowering the amount of harmful chemicals sprayed on fields. Nano sensors allow farmers to monitor soil moisture, nutrient levels, temperature, and plant health in real time, helping them make better farming decisions and practice precision agriculture. Nanotechnology also improves water purification, food processing, packaging, and post-harvest storage, which helps maintain food quality and reduce wastage. By saving water, fertilizers, and pesticides, this technology supports sustainable farming and increases crop yield and farmer income. However, challenges such as high costs, lack of awareness among farmers, technical difficulties, and possible environmental risks still need attention. Overall, nanotechnology offers a promising pathway toward sustainable agriculture and future food security.

By
JEEVAVARSHINI A

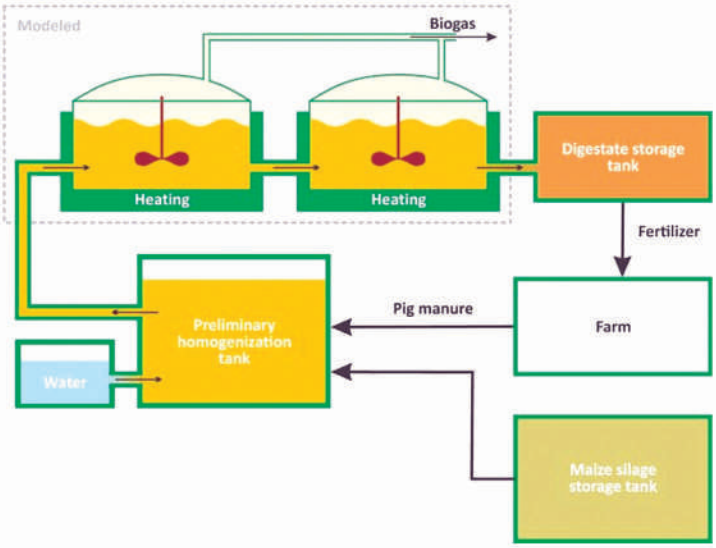
2. EVOLUTION OF FARMING EQUIPMENT

Agriculture has evolved from a labor-intensive activity to a highly mechanized and efficient industry thanks in large part to the advancement of farming equipment. The advancement of farming equipment and tools over the ages has led to gains in sustainability, efficiency, and productivity. Ancient agricultural communities used crude and basic farming implements. Stone, bone, or wood were the main materials used to make early tools like the sickle, hoe, and hand-held plows. Although they needed a lot of human labor and couldn't process vast land areas, these instruments worked well for small-scale subsistence farming. Draft animals like oxen and horses were used to drive plows and carts when human communities started to domesticate animals, which marked a significant. With the advent of gasoline-powered tractors in the late 19th and early 20th centuries, farm equipment's strength and adaptability were further enhanced. Plowing, tilling, and hauling were just a few of the many uses for these more dependable tractors. With the availability of such machines, farmers were able to work larger plots of land, leading to the rise of commercial farming and the decline of small, family-operated farms. In the second half of the 20th century, technological advancements such as the introduction of combine harvesters, which integrated reaping, threshing, and winnowing into a single process, revolutionized crop production. At the same time, improvements like irrigation systems, fertilization equipment, and pesticide sprayers helped raise food yields while minimizing physical work.

By
DHARANISHWARAN S

3. BIOGAS PRODUCTION FROM AGRICULTURAL WASTE

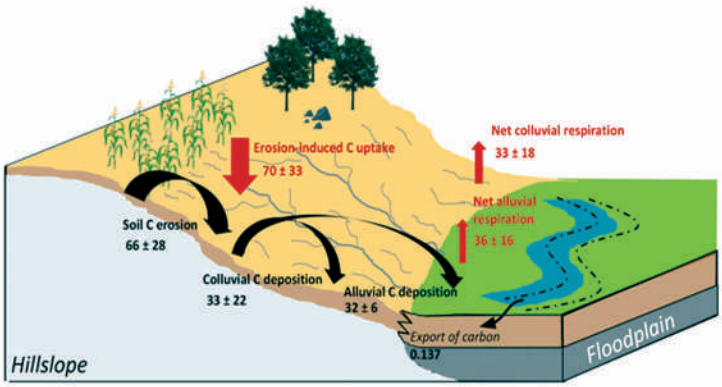
Biogas production from agricultural waste is a simple and environmentally friendly way to produce renewable energy using materials like crop residues, rice husk, wheat straw, animal manure, and food waste. In this method, organic waste is broken down by microorganisms in the absence of oxygen inside a biogas plant, a process known as anaerobic digestion. This process produces biogas, mainly made up of methane and carbon dioxide. The methane in the gas can be used for cooking, heating, generating electricity, and even as fuel for vehicles after purification. A biogas plant usually includes an inlet chamber, digester, gas storage unit, and outlet chamber. One of the biggest benefits of biogas technology is that it converts waste into useful energy while reducing environmental pollution. The leftover slurry from the process is rich in nutrients and can be used as a natural fertilizer to improve soil quality and crop growth. Biogas production also helps reduce greenhouse gas emissions and decreases dependence on fossil fuels. Since agricultural waste is easily available in rural areas, this technology provides an affordable and sustainable energy solution while also supporting clean energy and environmental protection.



By
MANOSRI V

4. SOIL EROSION CONTROL USING ENGINEERING TECHNIQUES

Soil erosion control using engineering techniques refers to the application of structural and mechanical methods to prevent the detachment, transportation, and loss of topsoil caused by water, wind, and human activities. It is essential for maintaining soil fertility, reducing land degradation, and protecting infrastructure. Common engineering techniques include contour bunding, terracing, check dams, gabion structures, retaining walls, and drainage control systems. Contour bunding involves constructing small earthen embankments along contour lines to reduce runoff velocity and increase water infiltration. Terracing is widely used in hilly regions where land is shaped into step-like fields to minimize slope length and control soil movement. Check dams are small barriers built across streams to slow down water flow, reduce erosion, and promote sediment deposition. Gabion structures, made of wire mesh filled with stones, are effective in stabilizing riverbanks and preventing soil loss. Proper drainage systems are also designed to safely divert excess water without damaging the soil surface. These engineering measures are often combined with vegetation practices for better results. Soil erosion control not only improves agricultural productivity but also prevents flooding, siltation of water bodies, and land degradation. Therefore, engineering techniques play a crucial role in sustainable land management and environmental conservation, especially in areas prone to heavy rainfall and steep slopes.



Erosion-induced lateral and vertical carbon fluxes in terragram of C (Tg of C) integrated for the period 1850–2005 over the Rhine catchment

By
MANASWINI M Y

PROJECT

1. DESIGN AND FABRICATION OF GROUNDNUT SHELL REMOVING MACHINE USING BATTERY

Groundnut (peanut) shelling is an important post-harvest process traditionally done manually by farmers. This method requires more labor, consumes time, and reduces efficiency, especially for small-scale farmers. To overcome these problems, this project presents the design and fabrication of a portable groundnut shell removing machine powered by a battery and supported by solar energy. The machine is designed to improve shelling efficiency while minimizing human effort and operating cost. It consists of components such as a DC motor, battery, solar panel, rotating disc, shaft, bearings, frame, and chain drive mechanism. The working principle is based on rubbing, impact, and shearing action. Groundnuts are fed through a hopper, where the rotating disc removes the outer shell without damaging the kernels. The shells and kernels are then separated and collected efficiently. The use of solar energy and battery backup ensures continuous operation even in rural areas with limited electricity supply, making the system eco-friendly and sustainable. The machine is compact, portable, and easy to operate, making it suitable for small agricultural applications. This project reduces labor, increases productivity, improves output quality, and encourages renewable energy use in agriculture.

By
AKSHAYA M
BHARATH S
MOHAMMED AMEERDEEN R

2. DEVELOPMENT OF A VACUUM BASED CUTTER CUM COLLECTION MECHANISM FOR ORNAMENTAL PLANTS

The design of a vacuum-based cutting and collection system for landscape plants is developed to improve the efficiency, cleanliness, and safety of plant maintenance operations. Traditional methods of trimming and pruning plants often create scattered waste, require more manual labor, and consume significant time. To over comet he seed raw backs, the proposed system combines a mechanical cutting mechanism with a vacuum-assisted suction and collection unit. The cutting unit is designed to provide accurate trimming of landscape plants such as hedges, shrubs, grasses, and ornamental bushes. Simultaneously, the vacuum system sucks the cut leaves, branches, and plant debris directly into a collection chamber. This integrated operation reduces the need for manual cleaning and prevents waste from spreading across gardens and public landscapes. The collected plant material is transported through suction pipes and stored safely for easy disposal or reuse as compost or organic mulch. The system is lightweight, portable, and energy-efficient, making it suitable for use in parks, gardens, campuses, roadside plantations, and residential landscapes. The design also ensures easy handling and reduced operator fatigue during long working hours. By combining cutting and waste collection in a single operation, the system saves time, lowers labor costs and improves overall productivity. Therefore, the vacuum-based cutting and collection system provides.

By
DAYA LITHEYESH T
JAYASHREE
NATHIYA A

3. DEVELOPMENT AND PERFORMANCE ANALYSIS OF ENGINE OPERATED PADDY TRANSPLANTER

Transplanting is one of the most important operations in paddy cultivation, as it directly affects crop growth and yield. Compared to traditional manual transplanting methods generated by the engine is transmitted through a chain and sprocket mechanism, enabling smooth and continuous operation of the machine. The transplanted operates at an average speed of about 2 km/h with a working width of 80 cm, making it suitable for wetland farming conditions. Under normal field conditions, the machine can cover approximately 0.12 hectares per hour. Seedlings grown in mat-type nurseries are picked by mechanical arms and transplanted into the soil at a uniform depth. The machine maintains a row spacing of 30 cm and plant spacing of 15 cm, promoting healthy crop growth and efficient use of nutrients, water, and sunlight, the use of a paddy transplanted improves efficiency, reduces labor requirements, and ensures uniform spacing between plants. The proposed engine-operated paddy transplanter is powered by a 52 cc petrol engine capable of delivering 2 horsepower (1.5 kW). The power

By
MAGESHVARAN V
PRAKASH R
PRAWIN C

4. MECHANICAL CASSAVA STEM PLANTING MACHINE FOR SMALL SCALE FARMERS

Cassava cultivation, a major source of food and income in tropical regions, is often limited by labor-intensive planting methods used by small-scale farmers. Traditional cassava planting involves manually cutting and placing stem cuttings into the soil, a process that is slow, physically demanding, and inconsistent in terms of spacing and planting depth. These challenges can reduce crop establishment, lower productivity, and increase production costs. To overcome these limitations, a mechanical cassava stem planting machine was designed and developed for small-scale farming systems. The machine improves planting efficiency by integrating essential operations such as stem cutting, placement, and soil covering into a single process. It is designed to ensure uniform planting depth and spacing, which are important for healthy crop growth and improved yields. The planter is affordable, easy to operate, and adaptable to different cassava varieties and soil conditions, making it suitable for rural farming communities. Key components of the machine include a stem-cutting mechanism, a planting unit for accurate stem placement, and a soil-covering device that promotes proper soil-to-stem contact. Field evaluations showed that the machine achieved faster planting rates than manual methods while maintaining good planting quality. Its adoption can reduce labor requirements, minimize drudgery, improve productivity, and increase farmers' profitability, thereby contributing to sustainable cassava production and enhanced food security.

By
KISHORE R
MADHAVAN S
PRAVEEN P

DRAWINGS

By
INIYAVAN K

By
MOHAN MADHAN P

By
ENBARASI E

By
PRIYADHARSHINI R V

CRAFT WORK

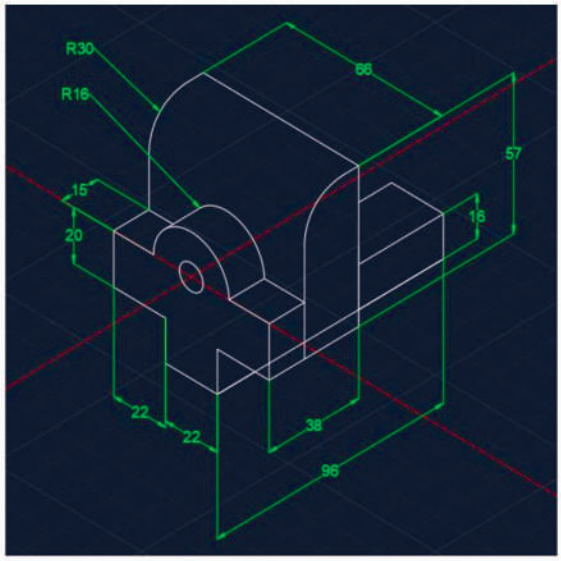
By
ANURADHA N

By
MOHAN MADHAN P

By
CHIPA ANGELIN A

By
PRAVEEN D

AUTO-CAD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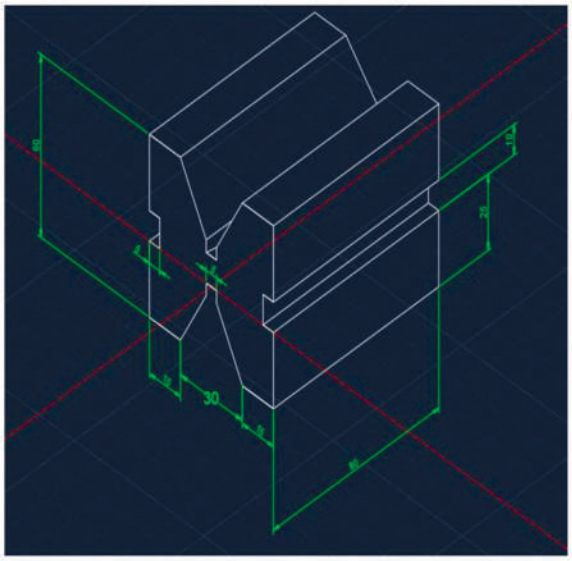
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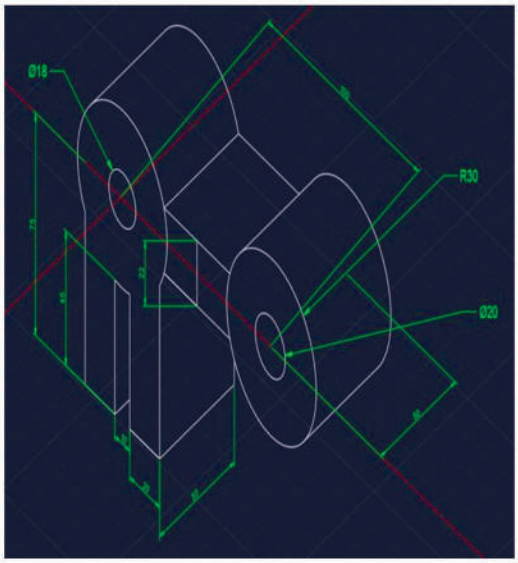
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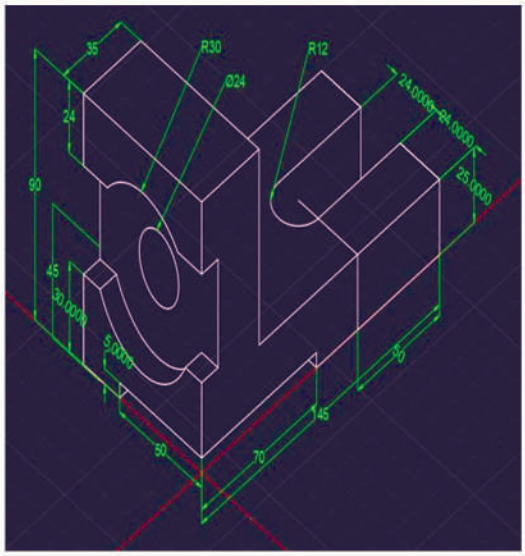
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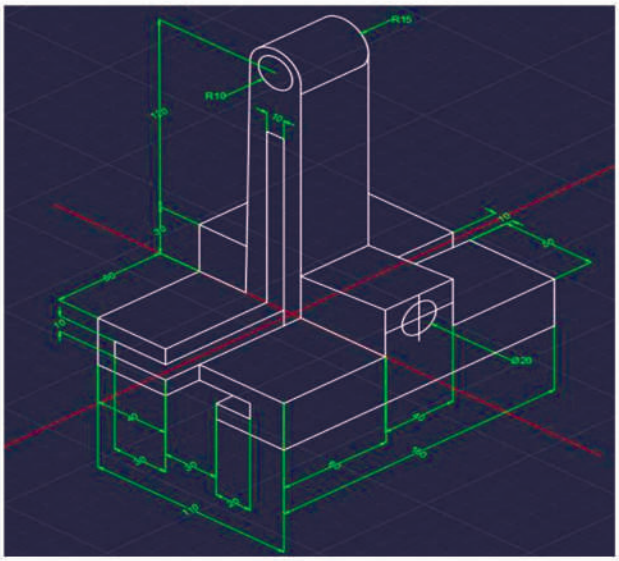
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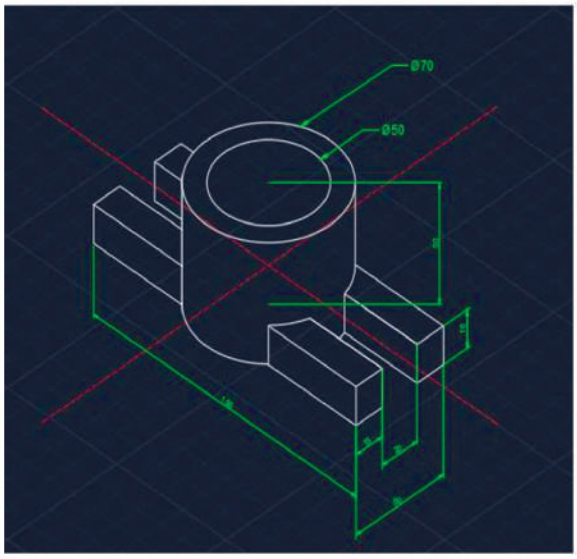
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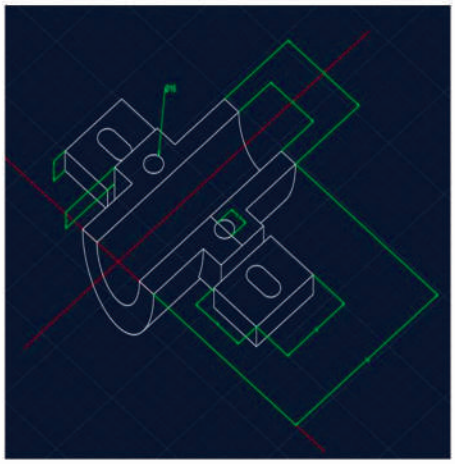
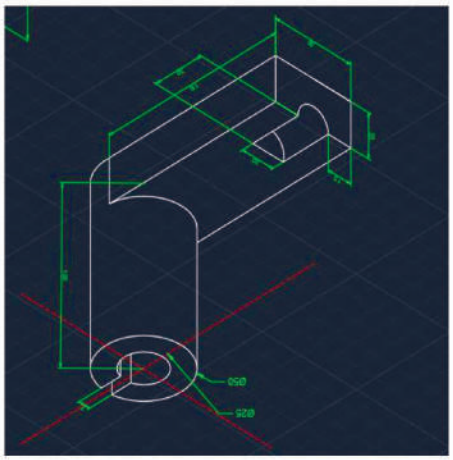
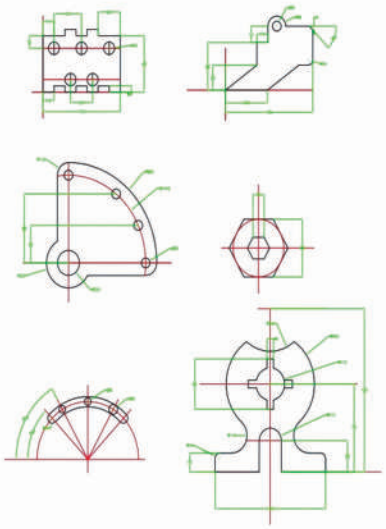
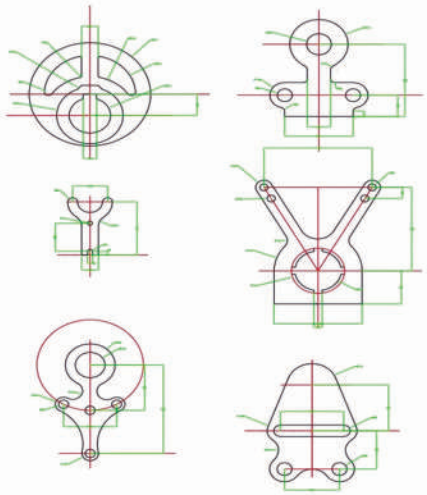
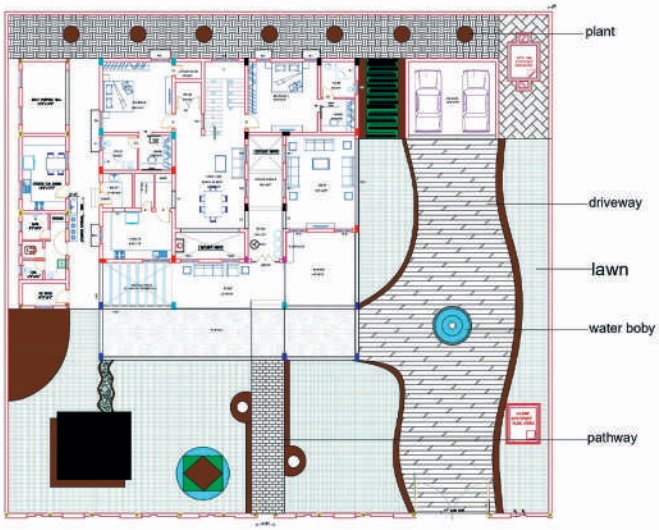






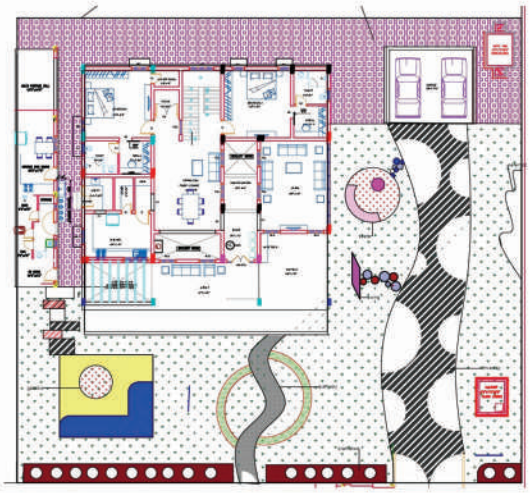


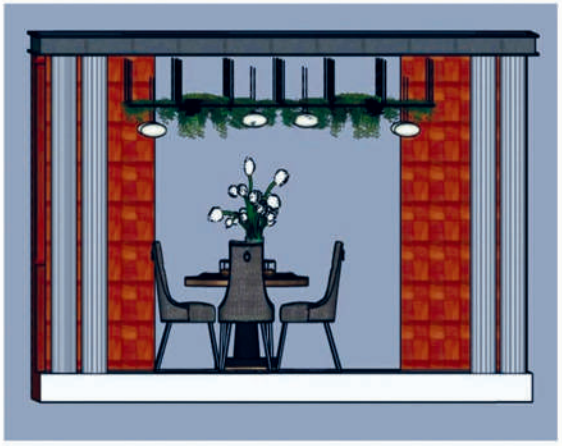
LANDSCAPE



SITE PLAN

LANDSCAPE





COLLEGE VISION & MISSION

• VISION

"To become Internationally Renowned Institution in Technical Education, Research and Development by transforming the students into Competent Professionals with Leadership Skills and Ethical values"

• MISSION

- Providing the Best Resources and Infrastructure.
- Creating Learner – Centric Environment and continuous learning.
- Promoting Effective Links with Intellectuals and Industries.
- Enriching Employability and Entrepreneurial Skills.
- Adapting to Change for sustainable Development.

DEPARTMENT VISION & MISSION

• VISION

"To produce excellent professionals in agricultural engineering through quality education, leadership skills and ethical values to serve the society."

• MISSION

- Providing in-depth knowledge and applications of agricultural machineries and associated process with embedded technology.
- Developing multidisciplinary learning environment with leadership skills..
- Impart training in entrepreneurial and life skills for enhancing employability.

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