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1.3.1: Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Environment and e Human Values, Sustainability in transacting the Curriculum

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1.3.1: Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Environment and e Human Values, Sustainability in transacting the Curriculum

The different Courses offered in various Programs in R20 Regulations

1. Constitution of India
2. Environmental Engineering
3. Essence of Indian Traditional Knowledge
4. Universal Human Values-Understanding Harmony
5. Managerial Economics & Financial Analysis

Program	Course	I Year		II Year		III Year		IV Year	
		I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem
Civil Engineering	Constitution of India			√					
	Environmental Engineering				√				
	Managerial Economics & Financial Analysis				√				
	Environmental Engineering Lab				√				
	Open Elective Course/Job Oriented Elective (OE-1)					√			
	Essence of Indian Traditional Knowledge					√			
	Employability Skills						√		
	Universal Human Values-Understanding Harmony						√		
	Skill advanced course/ soft skill course:						√		

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Program	Course	I Year		II Year		III Year		IV Year	
		I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem
EEE	Constitution of India		√						
	Managerial Economics & Financial Analysis				√				
	Professional Ethics & Human Values			√					
	Employability Skills					√			
	Universal Human Values-Understanding Harmony							√	

Program	Course	I Year		II Year		III Year		IV Year	
		I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem
Mechanical Engineering	Constitution of India		√						
	Environmental Science	√							
	Professional Ethics and Human Values					√			
	Essence of Indian Traditional Knowledge			√					

Program	Course	I Year		II Year		III Year		IV Year	
		I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem
ECE	Constitution of India				√				
	Environmental Science		√						
	Management & Organisational Behaviour				√				
	Essence of Indian Traditional Knowledge					√			

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Program	Course	I Year		II Year		III Year		IV Year	
		I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem
CSE	Constitution of India			√					
	Environmental Science		√						
	Managerial Economics & Financial Analysis				√				
	Employability Skills					√	√		
	Universal Human Values- Understanding Harmony							√	

Program	Course	I Year		II Year		III Year		IV Year	
		I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem
Agricultural Engineering	Constitution of India			√					
	Environmental Science		√						
	Professional Ethics & Human Values					√			
	Employability Skills						√		

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Program	Course	I Year		II Year		III Year		IV Year	
		I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem
CSE (AIML)	Constitution of India		√						
	Environmental Science	√							
	Managerial Economics & Financial Analysis				√				
	Essence of Indian Traditional Knowledge			√					
	Employability Skills					√	√		
	Universal Human Values-Understanding Harmony							√	

Program	Course	I Year		II Year		III Year		IV Year	
		I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem
CSE (DS)	Constitution of India		√						
	Environmental Science	√							
	Managerial Economics & Financial Analysis				√				
	Essence of Indian Traditional Knowledge			√					
	Employability Skills					√	√		
	Universal Human Values-Understanding Harmony							√	

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Name of The Course	Description
Environment Science	Based on this course, the Engineering graduate will understand/evaluate/develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development.
Constitution of India	The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India's legacy of "diversity". It has been said that Indian constitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be "static" and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution.
Professional Ethics & Human Values	To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.
Research Methodology & Intellectual Property Rights	This course offers an Introduction to Intellectual property: international organizations, agencies and treaties, importance of intellectual property rights. Law of copy rights: Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law. Law of patents: Foundation of patent law, patent searching process, ownership rights.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE STRUCTURE AND SYLLABUS

For UG – R20

B. TECH - ELECTRONICS AND COMMUNICATION ENGINEERING

(Applicable for batches admitted from 2020-2021)

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KAKINADA – 533 003, Andhra Pradesh, India

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE STRUCTURE

I Year –I SEMESTER

S. No.	Category	Subjects	L	T	P	Credits
1	HS	Communicative English	3	0	0	3
2	BS	Mathematics –I(Calculus)	3	0	0	3
3	BS	Applied Chemistry	3	0	0	3
4	ES	Programming for Problem Solving Using C	3	0	0	3
5	BS	Engineering Drawing	2	0	2	3
6	LC	English Communication Skills Laboratory	0	0	3	1.5
7	LC	Applied Chemistry Lab	0	0	3	1.5
8	LC	Programming for Problem Solving Using C Lab	0	0	3	1.5
					Total Credits	**19.5**

I Year – II SEMESTER

S. No	Category	Subjects	L	T	P	Credits
1	BS	Mathematics –II (Linear Algebra and Numerical Methods)	3	0	0	3
2	BS	Applied Physics	3	0	0	3
3	ES	Object Oriented Programming through Java	2	0	2	3
4	ES	Network Analysis	3	0	0	3
5	ES	Basic Electrical Engineering	3	0	0	3
6	LC	Electronic workshop Lab	0	0	3	1.5
7	LC	Basic Electrical Engineering Lab	0	0	3	1.5
8	LC	Applied Physics Lab	0	0	3	1.5
9	MC	Environmental Science	3	0	0	0.0
					Total Credits	**19.5**

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II Year –I Semester

S. No	Category	Name of the Subject	L	T	P	Credits
1	PC	Electronic Devices and Circuits	3	1	0	3
2	PC	Switching Theory and Logic Design	3	1	0	3
3	PC	Signals and Systems	3	1	0	3
4	BS	Mathematics-III (Transforms and Vector Calculus)	3	1	0	3
5	BS	Random Variables and Stochastic Processes	3	1	0	3
6	LC	OOPS through Java Lab	0	0	2	1.5
7	LC	Electronic Devices and Circuits -Lab	0	0	2	1.5
8	LC	Switching Theory and Logic Design–Lab	0	0	2	1.5
9	SC	Python Programming	0	0	4	2
					Total Credits	**21.5**

II Year – II Semester

S. No	Category	Name of the subject	L	T	P	Credits
1	PC	Electronic Circuit Analysis	3	1	0	3
2	PC	Digital IC Design	3	1	0	3
3	PC	Analog Communications	3	0	0	3
4	ES	Linear control Systems	3	1	0	3
5	HS	Management and Organizational Behavior	3	0	0	3
6	LC	Electronic Circuit Analysis Lab	0	0	3	1.5
7	LC	Analog Communications Lab	0	0	3	1.5
8	LC	Digital IC Design Lab	0	0	3	1.5
9	SC	Soft Skills	0	0	4	2
10	MC	Constitution of India	3	0	0	0
					Total Credits	**21.5**
Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)						**4**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

III Year - I Semester

S. No	Category	Name of the subject	L	T	P	Credits
1	PC	Analog ICs and Applications	3	0	0	3
2	PC	Electromagnetic Waves and Transmission Lines	3	0	0	3
3	PC	Digital Communications	3	0	0	3
4	OE1	Open Elective Course/Job oriented elective-1	2	0	2	3
5	PE1	Professional Elective courses -1	3	0	0	3
6	LC	Analog ICs and Applications LAB	0	0	3	1.5
7	LC	Digital Communications Lab	0	0	3	1.5
8	SC	Data Structures using Java Lab	0	0	4	2
9	MC	Indian Traditional Knowledge	2	0	0	0
	Summer Internship 2 Months (Mandatory) after second year (to be evaluated during V semester		0	0	0	1.5
					Total credits	21.5
	Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)					4

PE1:	OE1:
1. Antenna and Wave Propagation 2.Electronic Measurements and Instrumentation 3.Computer Architecture & Organization	Candidate should select the subject from list of subjects offered by other departments

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I Year - II Semester		L	T	P	C
		3	0	0	0
ENVIRONMENTAL SCIENCE					

Course Objective:

Engineering drawing being the principal method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

Unit I

Objective: To introduce the students to use drawing instruments and to draw polygons, Engg. Curves.
Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles.
Curves: Parabola, Ellipse and Hyperbola by general and special methods, cycloids, involutes, tangents &normals for the curves.
Scales: Plain scales, diagonal scales and vernier scales

Unit II

Objective: To introduce the students to use orthographic projections, projections of points & simple lines. To make the students draw the projections of the lines inclined to both the planes.
Orthographic Projections: Reference plane, importance of reference lines, projections of points in various quadrants, projections of lines, line parallel to both the planes, line parallel to one plane and inclined to other plane.
Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces.

Unit III

Objective: The objective is to make the students draw the projections of the plane inclined toboth the planes.
Projections of planes: regular planes perpendicular/parallel to one reference plane and inclined to the other reference plane; inclined to both the reference planes.

Unit IV

Objective: The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.
Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to both the planes.

Unit V

Objective: The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views. Computer Aided Design, Drawing practice using Auto CAD, Creating 2D&3D drawings of objects using Auto CAD

Note: In the End Examination there will be no question from CAD.

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TEXT BOOKS:
1. Engineering Drawing by N.D. Butt, Chariot Publications
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers

REFERENCE BOOKS:
1. Engineering Drawing by K.L.Narayana& P. Kannaiah, Scitech Publishers
2. Engineering Graphics for Degree by K.C. John, PHI Publishers
3. Engineering Graphics by PI Varghese, McGrawHill Publishers
4. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age

Course Outcome: The student will learn how to visualize 2D & 3D objects.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

II Year - II Semester		L	T	P	C
		3	0	0	3

MANAGEMENT AND ORGANISATIONAL BEHAVIOUR

Course Objectives:

- To familiarize with the process of management, principles, leadership styles and basic concepts on Organization.
- To provide conceptua l knowledge on functional management that ison Human resource management and Marketing management.
- To provide basic insight into select contemporary management practices and Strategic Management.
- To learn theories of motivation and alsodeals with individual behavior, their personality and perception of individuals.
- To understand about organizations groups that affect the climate of an entire organizations which helps employees instress management.

Unit - I

Introduction: Management and organizational concepts of management and organization- Nature and Importance of Management, Functions of Management, System approach to Management- Taylor's Scientific Management Theory, Fayol's Principles of Management, Leadership Styles, Social responsibilities of Management. Designing Organizational Structures: Basic concepts related to Organization - Departmentation and Decentralization, MBO, Processandconcepts.

Unit - II

Functional Management: Human Resource Management (HRM) Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Wage and Salary Administration Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.- Marketing Management: Concepts of Marketing, Marketing mix elements and marketing strategies.

Unit - III

Strategic Management: Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

Unit - IV

Individual Behavior: Perception – Perceptual process – Impression management – Personality development – Socialization – Attitude – Process – Formation – Positive attitude – Change – Learning – Learning organizations – Reinforcement Motivation – Process – Motives – Theories of Motivation: Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation

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Unit - V

Group Dynamics: Types of Groups, Stagesof Group Development, Group Behaviour and Group Performance Factors, Organizational conflicts: Reasons for Conflicts, Consequences of Conflictsin Organization, Types of Conflicts, Strategies for Managing Conflicts, Organizational ClimateandCulture, Stress, Causesand effects,copingstrategies of stress.

ReferenceBooks:

1. Subba Rao P., *Organizational Behaviour,* Himalaya Publishing House, Mumbai.
2. Fred Luthans *Organizational Behaviour*, TMH, NewDelhi.
3. Robins, Stephen P., *Fundamentals of Management,* Pearson, India.
4. Kotler Philip & Keller Kevin Lane: Marketing Mangement 12/e, PHI, 2007
5. Koontz & Weihrich: *Essentials of Management*, 6/e, TMH, 2007
6. Kanishka Bedi, *Production and Operations Management*, Oxford University Press, 2007.

Course Outcomes:

- After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational structure.
- Will familiarize with the concepts of functional management that is HR Mand Marketing of new product developments.
- The learnerisable to think in strategically through contemporary management practices.
- The learner can develop positive attitude through personality development and can equip with motivational theories.
- The student can attain the group performance and grievance handling in managing the organizational culture.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

II Year I Semester		L	T	P	C
		2	0	0	0
PROFESSIONAL ETHICS & HUMAN VALUES					

Preamble:
This course is a mandatory course introduced to impart the Ethics and Human Values to the students in engineering education.

Course Objectives:

- To create an awareness on Engineering Ethics and Human Values.
- To instill Moral and Social Values and Loyalty
- To appreciate the rights of others
- To create awareness on assessment of safety and risk

UNIT -I

Human Values:

Morals, Values and Ethics-Integrity-Work Ethic-Service learning – Civic Virtue – Respect for others –Living Peacefully –Caring –Sharing –Honesty -Courage-Cooperation– Commitment – Empathy –Self Confidence Character –Spirituality.

Learning outcomes:

1. Learn about morals, values & work ethics.
2. Learn to respect others and develop civic virtue.
3. Develop commitment
4. Learn how to live peacefully

UNIT -II

Engineering Ethics:

Senses of 'Engineering Ethics-Variety of moral issued –Types of inquiry –Moral dilemmas – Moral autonomy –Kohlberg's theory-Gilligan's Theory-Consensus and controversy –Models of professional roles-Theories about right action-Self-interest -Customs and religion –Uses of Ethical theories –Valuing time –Cooperation –Commitment.

Learning outcomes:

1. Learn about the ethical responsibilities of the engineers.
2. Create awareness about the customs and religions.
3. Learn time management
4. Learn about the different professional roles.

UNIT -III

Engineering as Social Experimentation:

Engineering As Social Experimentation –Framing the problem –Determining the facts – Codes of Ethics –Clarifying Concepts –Application issues –Common Ground -General Principles –Utilitarian thinking respect for persons.

Learning outcomes:

1. Demonstrate knowledge to become a social experimenter.
2. Provide depth knowledge on framing of the problem and determining the facts.
3. Provide depth knowledge on codes of ethics.
4. Develop utilitarian thinking

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UNIT -IV

Engineers Responsibility for Safety and Risk:

Safety and risk –Assessment of safety and risk –Risk benefit analysis and reducing risk-Safety and the Engineer-Designing for the safety-Intellectual Property rights (IPR).

Learning outcomes:

1. Create awareness about safety, risk & risk benefit analysis.
2. Engineer's design practices for providing safety.
3. Provide knowledge on intellectual property rights.

UINIT- V

Global Issues:

Globalization –Cross-culture issues-Environmental Ethics –Computer Ethics –Computers as the instrument of Unethical behavior –Computers as the object of Unethical acts – Autonomous Computers-Computer codes of Ethics –Weapons Development -Ethics and Research –Analyzing Ethical Problems in research.

Learning outcomes:

1. Develop knowledge about global issues.
2. Create awareness on computer and environmental ethics
3. Analyze ethical problems in research.
4. Give a picture on weapons development.

Course outcomes:

Students will be able to:

- Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field
- Identify the multiple ethical interests at stake in a real-world situation or practice
- Articulate what makes a particular course of action ethically defensible
- Assess their own ethical values and the social context of problems
- Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects
- Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work
- Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research.

Text Books:

1) "Engineering Ethics includes Human Values" by M.Govindarajan, S.Natarajan and, V.S.Senthil Kumar-PHI Learning Pvt. Ltd-2009
2) "Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.
3) "Ethics in Engineering" by Mike W. Martin and Roland Schinzinger –Tata McGraw-Hill–2003.
4) "Professional Ethics and Morals" by Prof.A.R.Aryasri, DharanikotaSuyodhana-Maruthi Publications.
5) "Professional Ethics and Human Values" by A.Alavudeen, R.KalilRahman and M. Jayakumaran, Laxmi Publications.
6) "Professional Ethics and Human Values" by Prof.D.R.Kiran-"Indian Culture, Values and Professional Ethics" by PSR Murthy-BS Publication

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KAKINADA – 533 003, Andhra Pradesh, India
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

II Year II Semester		L	T	P	C
		3	0	0	3
MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS					

Course Objectives:

- The Learning objectives of this paper are to understand the concept and nature of Managerial Economics and its relationship with other disciplines and also to understand the Concept of Demand and Demand forecasting.
- To familiarize about the Production function, Input Output relationship, Cost-Output relationship and Cost-Volume-Profit Analysis.
- To understand the nature of markets, Methods of Pricing in the different market structures and to know the different forms of Business organization and the concept of Business Cycles.
- To learn different Accounting Systems, preparation of Financial Statement and uses of different tools for performance evaluation.
- Finally, it is also to understand the concept of Capital, Capital Budgeting and the techniques used to evaluate Capital Budgeting proposals.

Unit-I

Introduction to Managerial Economics and demand Analysis:

Definition of Managerial Economics –Scope of Managerial Economics and its relationship with other subjects –Concept of Demand, Types of Demand, Determinants of Demand-Demand schedule, Demand curve, Law of Demand and its limitations- Elasticity of Demand, Types of Elasticity of Demand and Measurement- Demand forecasting and Methods of forecasting, Concept of Supply and Law of Supply.

Unit – II:

Theories of Production and Cost Analyses:

Theories of Production function- Law of Variable Proportions-Isoquants and Isocosts and choice of least cost factor combination-Concepts of Returns to scale and Economies of scale-Different cost concepts: opportunity costs, explicit and implicit costs-Fixed costs, Variable Costs and Total costs –Cost –Volume-Profit Analysis-Determination of Breakeven point(problems)-Managerial significance and limitations of Breakeven point.

Unit – III:

Introduction to Markets, Theories of the Firm & Pricing Policies:

Market Structures: Perfect Competition, Monopoly, Monopolistic competition and Oligopoly – Features – Price and Output Determination – Managerial Theories of firm: Marris and Williamson's models – other Methods of Pricing: Average cost pricing, Limit Pricing, Market Skimming Pricing, Internet Pricing: (Flat Rate Pricing, Usage sensitive pricing) and Priority Pricing, Business Cycles: Meaning and Features – Phases of a Business Cycle. Features and Evaluation of Sole Trader, Partnership, Joint Stock Company – State/Public Enterprises and their forms.

Unit – IV:

Introduction to Accounting & Financing Analysis:

Introduction to Double Entry System, Journal, Ledger, Trail Balance and Preparation of Final Accounts with adjustments – Preparation of Financial Statements-Analysis and Interpretation of Financial Statements-Ratio Analysis – Preparation of Funds flow and cash flow analysis (Problems)

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KAKINADA – 533 003, Andhra Pradesh, India
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Unit – V:

Capital and Capital Budgeting: Capital Budgeting: Meaning of Capital-Capitalization-Meaning of Capital Budgeting-Time value of money- Methods of appraising Project profitability: Traditional Methods (payback period, accounting rate of return) and modern methods (Discounted cash flow method, Net Present Value method, Internal Rate of Return Method and Profitability Index)

Course Outcomes:

- The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.
- The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
- The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
- The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
- The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

Text Books:

1. Managerial Economics and Financial Analysis by A R Aryasri, McGraw – Hill, 3rd edition.

References Books:

1. Managerial Economics by Varshney R.L, K.L Maheswari, S. Chand & Company Ltd,
2. Managerial Economics, JL Pappas and EF Brigham, Holt, R & W; New edition.
3. Accounting for Management, N.P Srinivasn and M. Sakthivel Murugan, S. Chand & Company Ltd, 1st edition, 2011.
4. An Introduction to Accountancy by Maheswari S.N, Vikas Publishing House Pvt Ltd, 12th edition, 2018.
5. Financial Management by I.M Pandey, Vikas Publishing House Pvt Ltd, 9th edition, 2009.
6. Managerial Economics by V. Maheswari, S. Chand & Company Ltd, 2002.

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Email: principal.9t@gmail.com

Date: 29.09.2022

CIRCULAR

As part of the activity of NSS unit (90214619) of the college has organizing a **Swachh Bharath- awareness on not to use plastic** is arranged in the ZPHS Nunna on 1.10.2022. All are therefore, requested to attend and make the event a grand success & memorable.

NSS PROGRAM OFFICER

NSS PROGRAMME OFFICER
VIKAS GROUP OF INSTITUTIONS
UNIT No: 90214619
NUNNA-521 212, Vijayawada Rural
NTR Dist., A.P.

PRINCIPAL

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Email: principal.9t@gmail.com

Date: 03.10.2022

Program Report	
NSS Unit Code	90214619
Title of the Event	**Swachh Bharath-Awareness on Not To Use Plastic**
Event Start Date	01.10.2022
Event End Date	01.10.2022
Description	A program was organized by the NSS unit of the college at ZPHS School Nunna. The main motto of the program was to eradicate the use of plastic. The students of the college were actively involved in the program. The NSS volunteers have taken an initiative to organize a program an awareness on plastic free and awareness was made on all the harmful effects of plastic on environment in ZPHS School Students.

Awareness on not to use plastic

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Rally starts at Zphs school

To Create an Awareness on Not To Use Plastic for Zphs school Students

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NSS PROGRAMME OFFICER
VIKAS GROUP OF INSTITUTIONS
UNIT No. 90214098
NUNNA-521 212, Vijayawada Rural
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Nunna – 521 212, Vijayawada Rural.
Email: principal.9t@gmail.com

Name of the Event: Swachh Bharath

Date: 1-10-22

S No	Name of the Student	Hall Ticket No	Year	Signature
1	D. Basavanth	199T1A0205	4	D. Basavanth
2	K. Naveen	199T1A0305	4	K. Naveen
3	Ch. Ganesh Reddy	229T5A0203	A2	Ch. Ganesh Reddy
4	G. Adidh babu	199T1A0444	4	G. Adidh babu
5	S. Manikanta	199T1A0447	4	S. Manikanta
6	N. Vinay kumar	199T1A0309	4	N. Vinay kumar
7	M. Sathvesh	199T1A0430	4	M. Sathvesh
8	K. Chiranjeevi	219T5A0510	III	K. Chiranjeevi
9	K. Lavanya	219T1A0534	IInd	K. Lavanya
10	P. Durga Bhavani	219T1A0558	IInd	P. Durga Bhavani
11	Sk. Shamimmm	219T1A0563	IIND	Shamimmm
12	T. Sirisha	219T1A0567	IIND	T. Sirisha
13	A. Bhanu Ramya	219T1A0504	IIND	A. Bhanu Ramya
14	V. Srilakshmi	199T1A0551	IVth	V. Srilakshmi
15	K. Hari priya	209T5A0204	IVth	K. Hari priya
16	U. Nandini	219T1A0573	IIND	U. Nandini
17	A. Divya Bhavani	199T1A0501	IVth	A. Divya
18	S. Naveen	199T1A0523	IVth	S. Naveen
19	D. Charan Sai	219T1A0539	IInd	D. Charan
20	L. Siva Krishna	199T1A0426	IVth	L. Siva Krishna
21	K. Naga Vamsi	209T5A0216	IVth	K. Naga Vamsi
22	K. manasa	199T1A0554	IVth	K. manasa
23	P. Haripriya	199T1A0574	IVth	P. Haripriya
24	G. Subhashini	199T1A0534	IVth	G. Subhashini
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PRINCIPAL/DIRECTOR
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NSS PROGRAMME OFFICER
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UNIT No: 90214619
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NTR Dist., A.P.

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Email: principal.9t@gmail.com

Date: 01.07.2022

CIRCULAR

As part of the activity of NSS unit (90214619) of the college has organizing a **No plastic day-awareness on not to use plastic** is arranged in the adopted village on 03.07.2022. All are therefore, requested to attend and make the event a grand success.

NSS PROGRAM OFFICER
NSS PROGRAMME OFFICER
VIKAS GROUP OF INSTITUTIONS
UNIT No: 90214619
NUNNA-521 212, Vijayawada Rural
NTR Dist., A.P.

PRINCIPAL
PRINCIPAL/DIRECTOR
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Vijayawada Rural, NTR Dist., A.P.

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Email: principal.9t@gmail.com

Date: 04.07.2022

Program Report	
NSS Unit Code	90214619
Title of the Event	No Plastic Day-Awareness On Not To Use Plastic
Event Start Date	03.07.2022
Event End Date	03.07.2022
Description	Vikas group of Institutions has conducted plastic free campaign by spreading awareness to the residents of the following adopted village. Our Nss volunteers explain about the Plastic is everywhere and is contributing to the tipping of the Earth's climate. We went to around the fruit shops and explained to them that we are carrying out a "Plastic-free village" We educated them on how they could dispose plastic items that they currently had and requested them to say no to plastic in the future.

Explain about not to use plastic bags

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Email: principal.9t@gmail.com

Explain about not to use plastic bags

Explain about disadvantages of plastic covers

NSS PROGRAM OFFICER
VIKAS GROUP OF INSTITUTIONS
UNIT No. 9621403 9
NUNNA-521 212, Vijayawada Rural
NTR Dist., A.P.

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Vijayawada Rural, NTR Dist., A.P.

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ISO 9001 : 2015 Certified
Nunna – 521 212, Vijayawada Rural.
Email: principal.91@gmail.com

Name of the Event: NO PLASTIC DAY

Date: 3-9-22

S No	Name of the Student	Hall Ticket No	Year	Signature
1	B. Hanjusha	219T1A0606	III[rd]	B. Hanjusha
2	M. Greeshma	219T1A0543	II[nd]	M. Greeshma
3	K. SWESIKA	219T1A0531	II[nd]	Swesika
4	S. Ganesh	219T5A0504	II[nd]	S. Ganesh
5	B. TIRUPATHIReddy	199T1A0101A	4	B. TIRUPATHIReddy
6	B. Ravi-kJa ReDDY	209T5A0102	4	B. Ravi Teja Reddy
7	M. shiva krishnna	209T5A0107	4	M. Shiva Krishna
8	V. pavan kalyan	199T1A0209	4	V. pavan kalyan
9	B. Jagadeesh	209T5A0304	4	B. Jagadeesh
10	B. SITA RAM	199T1A0403	4	B. SITA RAM
11	K. neeraj Gopi Kumar	199T1A0419	4	K. Neeraj Gopi Kumar
12	L. Shiva krishna	199T1A0426	4	L. Shiva krishna
13	J. SRINIVAS RAO	199T1A0539	4	J. SRINIVAS RAO
14	J. Likitha	209T5D0405	2	J. Likitha
15	N. Pavani	219T1A0548	2	N Pavani
16	S. jhansi	219T1A0561	2	S. Jhansi
17	S Rammanikanta	199T1A0770	4th	S Rammanikanta
18	B. Mounika	209T1R0012	3rd	B. Mounika
19	G. Manisha	209T1R0031	3rd	G. manisha
20	M. Swathi	209T1R0002	3rd	M. Swathi
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PRINCIPAL/DIRECTOR
VIKAS GROUP OF INSTITUTIONS
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Vijayawada Rural, NTR Dist., A.P.

NSS PROGRAMME OFFICER
VIKAS GROUP OF INSTITUTIONS
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Email: principal.9t@gmail.com

Date: 23-09-2022

CIRCULAR

It is hereby informed to all lady staff and girl students that the women empowerment cell of VGTN is organizing program on "Women's Nutrition on 24-09-22 in our college campus from 2.00 P.M to 4.30 P.M. So, all the lady staff and students attend the program at Room No: A106

CO-ORDINATOR

PRINCIPAL

Copy to:

Signature of all HoDs								TPO	Office	Library
Civil	EEE	Mech	ECE	CSE	Agri	Pharma	MBA			

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Email: principal.9t@gmail.com

Date: 24-09-2022

LIST OF STUDENTS ENROLLED

Program: "Women's Nutrition

Speaker: Mr. Dr.Y.Naveen

Venue : Room no. A106

Date &Time: 24-09-2022 , 2:00PM to4:30PM

S.NO	NAME OF THE STUDENT	ROLL NO.	YEAR/Programe	Signature
1	G. Lakshmi Priyanka	209T1R0030	II Year	G.Lakshmi Priyanka
2	T. Lohika	209T1R0075	II year	T.Lohika
3	B. Ganga	199T1R0009	III year	B.Ganga
4	ch. Anushya	199T1R0018	III year	ch. Anushya
5	V. Pujitha	209T1R0005	II nd year	V. Pujitha
6	B. Nandini	199T1R0012	IV year	B. Nandini
7	B. Sisira	199T1R0013	III year	B. sisira
8	Ch.S.B. Maha lakshmi	199T1R0015	III year	Ch.S.B.Mahalakshmi
9	ch. Navya sri	199T1R0019	IV year	ch. Navya
10	D. Vagra Latha	199T1R0020	III Year	Vagralatha
11	M. Durga	199T1R0024	III year	M. Durga
12	B. Mohnika.	209T1R0012	II Year.	B. Mohnika
13	B. Sushma	199T1R0010	III Year	B. sushma
14	D. Gaothami	199T1R0023	IV year	D. Gaothami
15	G. Mohika	209T1R0031	II Year	G. mohika
16	G. Mounika	199T1R0028	III year	G. mounika
17	M. Suvathi	209T1R0002	II year	M. Suvathi.
18	D. Anitha	199T1R0022	III Years	D. Anitha.
19	E. Prasanna	199T1R0026	IV year	E. Prasanna
20	G. Kavya	199T1R0031	IV Year	G. Kavya
21	D. Anuja	199T1R0009	III years	D. Anuja
22	D. Akhila	209T1R0021	II Year	D. Akhila
23	G. KUSUMA	199T1R0035	III Year	G. Kusuma
24	T. Alekhya	199T1R0037	IV Year	T. Alekhya.
25	G. Naga Jahnavya	209T1R0036	II year	G. Naga Jahnavya
26	G. Mounika	209T1R0028	III year	Mounika

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27	A. Hymavathi	209T1R0008	III year	A. Hymavathi
28	P. Bavagni	209T1R0059	II year	P. Bavagni
29	T.M Anuchya	199T1R0038	IV year	T.M. Anuchya
30	T. Ramya	199T1R0039	IV year	T. Ramya
31	L. Bhavani	199T1R0053	III Year	Bhavani
32	B. Roja	209T1R0013	II nd year	B. Roja
33	M. Haripriya	199T1R0057	IV year	Haripriya
34	K Swarupa	209T1R0042	II year	Swarupa. K
35	Ch. Sudipya	209T1R0018	II nd year	Ch. Sudipya
36	R. Anahya	199T1A0585	IV Year	R. Anahya
37	S. Manika	199T1A0591	IV Year	S. Manika
38	D. Bala Sravya	209T1R0074	II nd year	D. Bala Sravya
39	S. Srivalli	199T1A0595	IV Year	S. Srivalli
40	B. mamatha	209T1R0005	II nd year	B mamatha
41	Sk. Reshma	199T1A0596	IV Year	Sk. Reshma
42	P. Sindhu	209T1R0060	II nd Year	P Sindhu
43	T. Pavani	199T1A0584	IV Year	T. Pavani
44	K. Sneha	199T1R0042	III year.	K. Sneha.
45	D. Krishna Sai Chandan	209T1R0019	II nd year	D. Krishna Sai Chandan
46	Y. Harshita	199T1A0589	IV Year	Y. Harshita
47	ANV. Vaishnavi	199T1R0003	III rd year	Vaishnavi.
48	Y. Ankitha	199T1A0586	III rd year	Y. Ankitha
49	K. Keerthana	209T1R0044	II nd Year	K
50	V. Yamini	199T1A0584	IV year	V. Yamini
51	S. Sirajunnisa	199T1A0593	III year.	S. Sirajunnisa
52	V. Divya	199T1A0A7	III Year.	V. Divya
53	Y. Heena Sailekha	199T1A0580	III year	Y. Heena Sailekha
54	Ch. Prasanna	199T1R0047	III nd Year	Ch. Prasanna
55	P. Priyanka	199T1A0573	III year.	P. Priyanka

CO-ORDINATOR

PRINCIPAL

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Email: principal.9t@gmail.com

DATE: 24-09-22

PROGRAMME REPORT

Program Name	"Women's Nutrition".
Resource person	Dr.Y.Naveen
Date of activity	24-09-22
Organized by	VIKAS GROUP OF INSTITUIONS
Venue	A 106

Objective of the Program:

Improving women's nutrition can help Nation achieve its goals, commonly accepted as a framework for measuring development progress. The main objective of this program is to impart knowledge to improve local diet, production and household behaviors through Nutrition and health education.

Outcomes of Program:

- Healthy women can Fulfil the multiple roles like generating income, ensuring their families nutrition more effectively and help advance countries socioeconomic development.
- . Improve the Quality of Women's lives and the survival and healthy development of their children.
- Prevention of malnutrition.
- It gives information and guidance pertaining to food, including the kinds and amounts of the food that are required to meet one's daily nutritional needs.

PROGRAM COORDINATOR

PRINCIPAL/DIRECTOR
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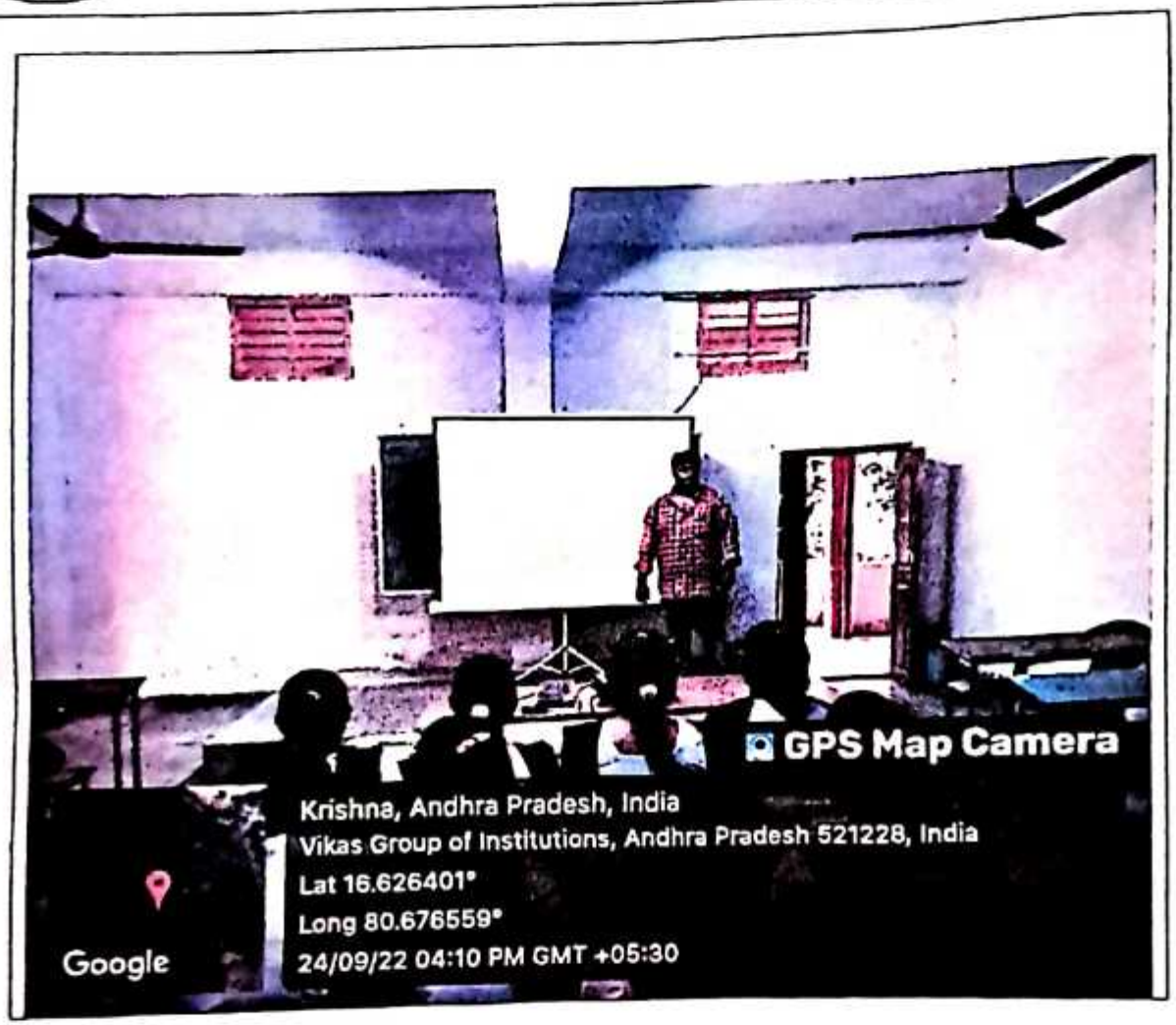

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Date: 11-02-23

CIRCULAR

It is hereby informed to all lady staff and girl students that a program on **"Awareness on Disha app and Self Defense** is going to be organized by Vikas Group of Institutions on 14-02-23 in the campus from 2.00-4.30 pm. So, all the girl students should attend the program .

Speaker : S.VENKANNA BABU
Venue : Room B205
Time : 2:00 PM to 4 .30 PM

CO-ORDINATOR

PRINCIPAL

Copy to:

Signature of all HoDs								TPO	IQAC	Office	Library
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Email: principal.9t@gmail.com

LIST OF PARTICIPANTS WITH SIGNATURE

NAME OF THE PROGRAM: Awareness on Disha App & Self-defence.
RESOURCE PERSON: S. Venkanna Babu. DATE: 14-02-23.

S.NO	ROLL NO	NAME OF THE STUDENT	YEAR/Program	Signature
1	219T1R0001	G. Rakitha	3rd year B.pharmacy	G.Rakitha
2	219T1R0002	A. Anuradha	2nd year B.pharmacy	A.Anuradha
3	219T1R0004	A. Sri durga	3rd year B.pharmacy	A.Sridurga
4	219T1R0007	B. Anitha	2nd year B.pharmacy	B. Anitha.
5	219T1R0008	B. Sravanthi	2nd year B.pharmacy	B. Sravanthi
6	219T1R0009	B. Akansha	2nd year B.pharmacy	B. Akansha
7	219T1R0010	B. Anu	2nd Year B. pharmacy	B. Anu
8	219T1R0011	Ch. Latha	3rd year B. Pharmacy	Ch. Latha
9	219T1R0012	N. Deepika.	2nd year B. Pharmacy	N. Deepika.
10	219T1R0013	D. Padma	2 year B. Pharmacy	D. Padma.
11	219T1R0016	D. Sravani	2nd Year B. pharmacy	D. Sravani
12	219T1R0018	F. Arthika	2nd year B. pharmacy	F. Arthika.
13	219T1R0020	G. Rakshitha.	2nd year B. pharmacy	G. Rakshitha
14	219T1R0021	G. Lahari	2nd Year B. Pharmacy	G. Lahari
15	219T1R0024	J. Rupa Sri bhavani	2nd year b. pharmacy	J. Bhavani
16	219T1R0026	K. Dhana lakshmi	2nd year B. pharmacy	K. Dhana
17	219T1R0027	K. ahalya	2nd year B. pharmacy	K. ahalya
18	219T1R0028	K. Priya varshitha	2nd year B. pharm	Priyavarshitha
19	219T1R0031	K. Esther Rani	2nd year B. pharmacy	K. Esther Rani
20	219T1R0032	K. Sai chitra	2nd year B. pharmacy	K. Sai chitra
21	219T1R0034	K. Rupa Sri	2nd year B. Pharmacy	K. Rupa Sri
22	219T1R0035	K. vihanika	2nd Year B. pharmacy	K. vihanika
23	219T1R0036	B. Ishwarya Priya	2nd year B. pharmacy	B. Ishwarya Priya
24	219T1R0037	M. Siri lakshmi	2nd year B. pharm	M. Siri lakshmi
25	219T1R0039	M. Lavanya	2nd year B. pharm	M. Lavanya
26	219T1R0043	M. Nikitha	2nd year B. pharm	M. Nikitha
27	219T1R0045	M. Sai Lekha	2nd Year B. pharma	M. Sai Lekha
28	219T1R0047	N. Hari priya	2nd Year B. pharm	Hari priya
29	219T1R0048	N. Soumya	2nd Year B. pharma	Soumya
30	219T1R0049	N. Ramya	2nd Year B. pharm	Ramya
31	219T1R0053	P. Kavya Sri	2nd Year B. pharmacy	Kavya Sri
32	219T1R0055	P. Priyanka.	2nd Year B. Pharmacy	P. Priyanka
33	219T1R0058	P. Mounika	2nd year B. Pharmacy	P. Mounika

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34	[illegible]	Sk. Kaiheen	2nd year pharmacy	Sk. Kaiheen
35	[illegible]	Sk. Nasreen	2nd year B.Pharm	Sk. Nasreen
36	[illegible]	Sk. Shahin	2nd Year Pharmacy	Sk. Shahin
37	[illegible]	SK. Thirumala Rai	2nd Year Pharmacy	Sk. Thirumala...
38	[illegible]	S. Lalitha	2nd Year pharmacy	S. Lalitha
39	[illegible]	S. Navya	2nd Year pharmacy	S. Navya
40	[illegible]	T. Sambhavi	2nd Year pharmacy	T. Sambhavi
41	[illegible]	A. Swathi	1st year (ECE)	A. Swathi
42	[illegible]	B. Bhavya Sri	3rd year (ECE)	B. Bhavya
43	[illegible]	D. Anusha	3rd year (ECE)	D. Anusha
44	[illegible]	J. Akshitha	3rd year (ECE)	J. Akshitha
45	[illegible]	L. Urmila Devi	2nd year (ECE)	L. Urmila Devi
46	[illegible]	M. Naga Anjali	2nd year (ECE)	M. Naga Anjali
47	[illegible]	N. Saraswathi	3rd year (ECE)	N. Saraswathi
48	[illegible]	P. Sricha	3rd year (ECE)	P. Sricha
49	[illegible]	T. Manvika	2nd year (ECE)	T. Manvika
50	[illegible]	T. Niratha	2nd year (ECE)	T. Niratha
51	[illegible]	T. Vanajakshi	3rd year (ECE)	T. Vanajakshi
52	[illegible]	B. Vasanthi	3rd Year (ECE)	B. Vasanthi
53	[illegible]	B. Srilatha	3rd year (ECE)	B. Srilatha
54	[illegible]	B. Anusha	3rd year (ECE)	B. Anusha
55	[illegible]	B. Akhila	3rd year (ECE)	B. Akhila
56	[illegible]	C. Maryamma	2nd year (ECE)	C. Maryamma
57	[illegible]	C. Pavani	3rd year (ECE)	C. Pavani
58	[illegible]	C. Madhavi	3rd year (ECE)	C. Madhavi
59	[illegible]	C. Anusha	3rd year (ECE)	C. Anusha
60	[illegible]	C. Guru pujitha	3rd year (ECE)	C. Guru pujitha

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Nunna – 521 212, Vijayawada Rural, A.P. India.
Email: principal.9t@gmail.com

PROGRAM REPORT

Program Name	"Awareness on Disha app and Self Defence"
Resource person	S.Venkanna Babu
Date of activity	14-02-23
Organized by	VIKAS GROUP OF INSTITUIONS
Venue	B 205

Objective of the Program

Disha app is an initiative taken up by the state government for the safety of women the main objective behind launching the app was to assist the in need and alert the closest police patrol car by prompting the SOS button or simply shaking the phone five times it provides users with important safety information such as emergency contacts, safe walking routes etc...

Outcomes of Program:

1. Women's safety involves practices and policies that reduce gender-based violence and fear of crime in women.

2. Self defence increases in self esteem , perceived control and confident while decreasing anxiety , fear and avoidance behaviours .

3. developing situational awareness and self-defence skills can help you protect women in any situation.

PROGRAM COORDINATOR

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Nunna – 521 212, Vijayawada Rural, A.P. India.

Email: principal.9t@gmail.com

PRINCIPAL/DIRECTOR
VIKAS GROUP OF INSTITUTIONS
Vijayawada Rural, NTR Dist., A.P.

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Nunna – 521 212, Vijayawada Rural, A.P, India.

Email: principal.91@gmail.com

Date: 02/03/2023.

CIRCULAR

The Women empowerment cell of our college is organizing a guest lecture on

"Women Leadership" on occasion of International Women's Day on 08/3/2023.

The speaker: Mrs. Jujavarapu Shirisha Eng. Pgm Manager, Gurugram.

Venue : B-205

Time : Session I (10AM to 1 PM) – for All girls, Students

All the girl students and staff must attend the session on the day.

CO-ORDINATOR

PRINCIPAL

Copy to:

Signature of all HoDs								TPO	Office	IQAC	Library
Civil	EEE	Mech	ECE	CSE	Agri	Pharma	MBA				

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Nunna – 521 212, Vijayawada Rural, A.P. India.
Email: principal.91@gmail.com

LIST OF STUDENTS ENROLLED

Program: "Women Leadership"
Speaker :. Mrs. Jujavarapu Shirisha
Venue: B-205
Date &Time: 08-03-2023 , 10.00 AM to 01.00 PM

S.NO	NAME OF THE STUDENT	ROLL NO	YEAR/Programe	Signature
1	G.Naga Ishwarya	209TIR0086	III rd Year	G.Ishwarya
2	A.Lakshmi Sathi	209TIR0005	III year	A.Lakshmi Sathi
3	G. Monika	209TIR0031	III Year	G.Monika
4	G.Lakshmi Priyanka	209TIR0030	III Year	G.Lakshmi
5	P. Mounika	209TIR0042	III Year	P.Mounika
6	P. Bindhu	209TIR0060	III Year	P.Bindhu
7	V. Pujitha	209TIR0005	III rd year	V.Pujitha
8	M. Jyothi	209TIR0002	III rd Year	M.Jyothi
9	G. Mounika	209TIR0028	III rd year	G.Mounika
10	P.Radhasri	209TIR0059	III rd year	P.Radhasri
11	T. Lohika	209TIR0015	III rd Year	T.Lohika
12	ch. Sudiya	209TIR0018	III rd year	ch.Sudiya
13	K. Keerthana	209TIR0044	III rd Year	K.
14	D. Venkata Sravya	209TIR0024	III rd year	D.Venkata Sravya
15	D. Anuja	1997IR0022	IV th year	D.Anuja
16	B. Mamatha	199TIR0005	IV th year	B.Mamatha
17	D. Krishna Sirichandana	209TIR0019	D.Tech III Yr	D.Krishna
18	ch. prasanna	1997IR0017	2nd year	Ch.prasanna
19	MV. Vaishnavi	199TIR0003	IInd year	Vaishnavi
20	B. Suma Sri	199TIR0007	IV th year	B.Suma Sri
21	B. Ganga	1997IR0009	IV Year	B.Ganga
22	D. Mahalakshmi	209TIR0021	2nd year	D.Mahalakshmi
23	B. Roja	209TIR0013	3rd year	B.Roja
24	B. Sushma	199TIR0010	IV Year	B.Sushma
25	B. Nandini	1997IR0012	IV year	B.Nandini
26	B. Sisira	1997IR0013	IV year	B.Sisira
27	ch.S.B Hahalakshmi	199TIR0015	IV year	ch.S.B Hahalakshmi
28	ch. Anushya	1997IR0018	IV Year	ch.Anushya
29	ch. Navyasri	199TIR0019	IV year	ch.Navyasri

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Email: principal.9t@gmail.com

30	D.Vagra Latha	199T1R0020	IV Year	Vagralatha
31	D.Anitha	199T1R0022	IV Year	D.Anitha
32	D. Eswarbabu	199T1R0023	IV year	D Eswarbabu
33	M Durga	199T1R0024	IV Year	M Durga.
34	E. Prasanna	199T1R0026	IV Year	E. Prasanna
35	G. Manika	199T1R0028	IV year	G. Manika
36	G. kavya	199T1R0031	IV Year	G. kavya
37	G. Kusuma	199T1R0035	IV year	G.K. Kusuma
38	T. Alekhya	199T1R0037	IV Year	T. Alekhya.
39	J. Madhusudhya	199T1R0038	IV Year	J. Madhusudhya
40	J. Ramya	199T1R0039	IV Year	J. Ramya.
41	K. Swarupa	199T1R0047	IV Year	K. Swarupa
42	K. Sneha	199T1R0048	IV year	K. Sneha.
43	L. Bhavani	199T1R0053	IV year	Bhavani
44	Haripriya	199T1R0057	IV Year	Haripriya
45	R. Anahya	199T1A0585	IV Year	Anahya
46	S. Mahika	199T1A0591	IV Year	S. Mahika
47	S. Srivalli	199T1A0599	IV Year	S. Srivalli
48	Sk. Reshma	199T1A0596	IV Year	Sk. Reshma
49	T. Pavani	199T1A05A1	IV Year	T. Pavani
50	T. Usha.	199T1A05A0	IV Year	T. Usha

CO-ORDINATOR

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Nunna – 521 212, Vijayawada Rural, A.P. India.

Email: principal.9t@gmail.com

DATE: 08-03-2023

PROGRAM REPORT

Program Name :	**"Women Leadership"**
Resource person	**Mrs. Jujuvarapu Shirisha**
Date of activity	08-03-2023
Organized by	VIKAS GROUP OF INSTITUIONS
Venue	B-205

Objective of the program:

When more women are empower to lead everyone benefits .Decades of studies show women leaders help increase productivity, enhance collaboration, inspire organizational dedication, and improve fairness.

The objective of our program is to develop women leaders capable of leading public and private institution and contributing business growth under the changing competitive world

Outcomes of Program: Students can

- Be seen as empathetic and supportive managers
- Take public stands on gender and racial equity at work..
- Mentor and sponsor other women
- Be committed to advocating for employee friendly policies and programs to attract and retain other women long term.

PROGRAM COORDINATOR

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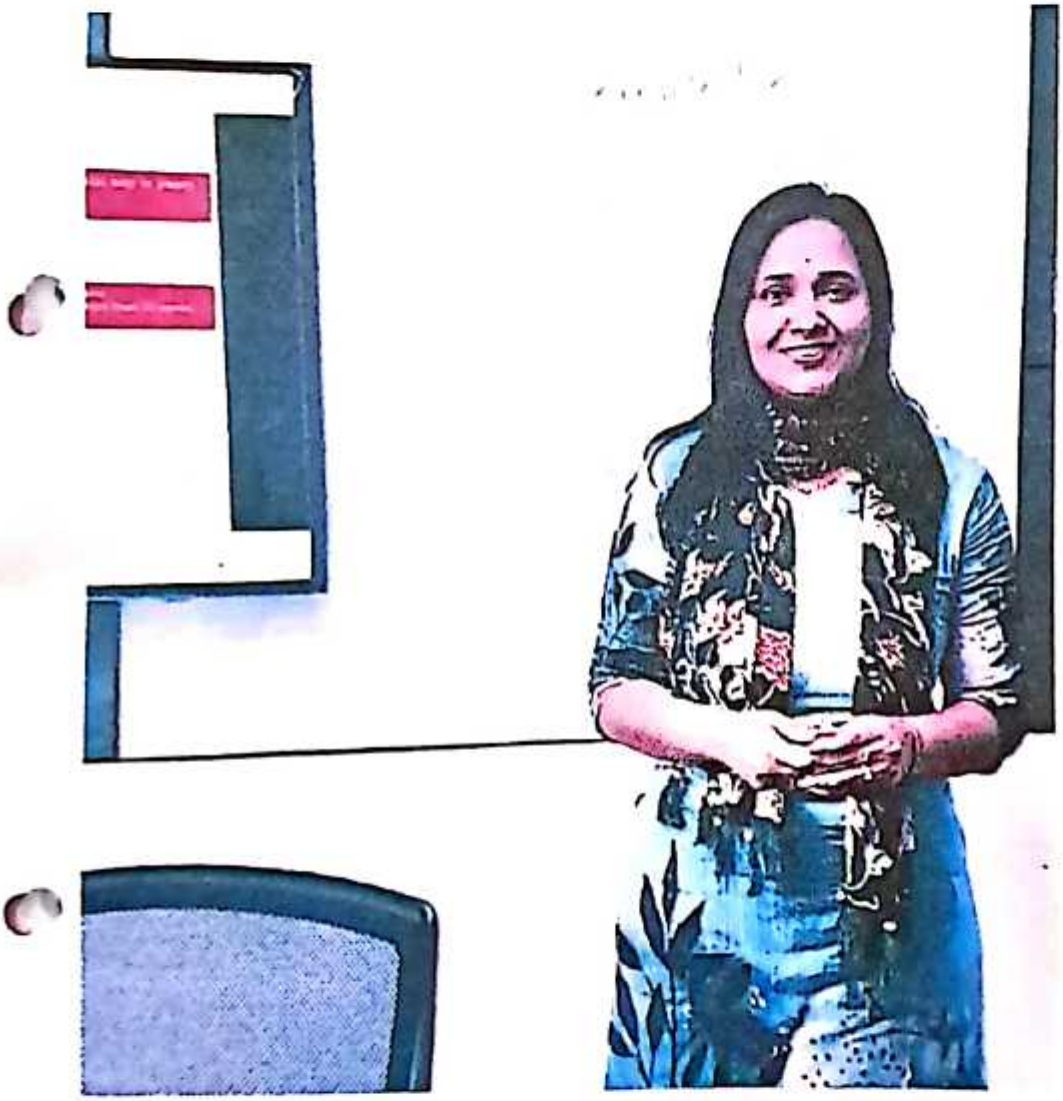

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Vijayawada R[illegible], A.P.

CERTIFICATE *OF* COMPLETION

This is to certify that

Vikas Group of Institutions

has successfully completed

ENVIRONMENTAL AUDIT

(WATER & WASTE MANAGEMENT)

The study was completed by Rekhapalli Environmental Solutions & Technologies Pvt Ltd

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NUNNA - 521 212
Vijayawada Rural, NTR Dist., A.P.

Dr Rekhapalli Srinivasa Rao

Green, Eco & Energy Lead Auditor
Certified ISO-14001 Auditor

Issued by

Rekhapalli Environmental Solutions & Technologies Pvt Ltd

January 2023

VIKAS GROUP OF INSTITUTIONS

NUNNA, VIJAYAWADA RURAL, NTR DISTRICT, A.P- 521212

Environmental Audit

(Water & Waste Management)

PRINCIPAL/DIRECTOR
VIKAS GROUP OF INSTITUTIONS
NUNNA - 521 212
Vijayawada Rural, NTR Dist., A.P.

CONTENTS

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VIKAS GROUP OF INSTITUTIONS
NUNNA - 521 212
Vijayawada Rural, NTR Dist., A.P.

Acknowledgements

REST Pvt Ltd

Dr Rekhapalli Srinivasa Rao
Green, Eco & Energy Lead Auditor
Certified ISO-14001 Auditor

20 January 2023

Environmental Audit (Water & Waste Management)

The REST Pvt Ltd acknowledges with thanks the cooperation extended to our team for completing the study at Vikas Group of Institutions (VGI).

The interactions and deliberations with VGI team were exemplary and the whole exercise was thoroughly a rewarding experience for us. We deeply appreciate the interest, enthusiasm, and commitment of VGI team towards environmental sustainability.

We are sure that the recommendations presented in this report will be implemented and the VGI team will be further improve their environmental performance.

Kind regards

Your sincerely

PRINCIPAL/DIRECTOR
VIKAS GROUP OF INSTITUTIONS
NUNNA - 521 212
Vijayawada Rural, NTR Dist., A.P.

Dr Rekhapalli Srinivasa Rao
Green, Eco & Energy Lead Auditor
Certified ISO-14001 Auditor
REST Pvt Ltd

Executive Summary

The growth of countries across the world is leading to increased consumption of natural resources. There is an urgent need to establish environmental sustainability in every activity we do. In a modern economy, environmental sustainability will play a critical role in the very existence of an organization.

An educational institution is no different. Built environment, especially an educational institution, has a considerable footprint on the environment. Impact on the environment due to energy Consumption, water usage and waste generation in an educational institute is prominent. Therefore, there is an imminent need to reduce the overall environmental footprint of the institution.

As an Institution of higher learning, Vikas Group of Institutions (VGI) firmly believes that there is an urgent need to address the environmental challenges and improve their environmental footprint.

True to its belief, VGI has implemented rainwater harvesting in the campus. Continuing with water conservation proposals, the college can also investigate the following recommendations:

- **Attain water positive status:** VGI should focus on capturing the harvested rainwater to substitute freshwater consumption, work on sustainable groundwater beyond the fence and create a framework towards attaining water positive status over a period. Presently, VGI is consuming nearly 80,000 liters of fresh water per day. Since metering is not available, the water consumption is calculated rather than measure value. The first step is to increase the water conservation activities in the campus to reduce water consumption at source. The next step is to increase the rainwater harvesting capacity to completely offset the freshwater requirements of the plant. VGI can also explore adopting lakes, desilting of ponds and restoration of water bodies in localities surrounding the campus. Water getting harvested in those structures can offset the freshwater consumption of the college.
- **Install water efficient fixtures:** The best way to conserve water is at the source. Therefore, VGI will have to install water efficient fixtures to reduce water consumption. Some of the water efficient fixtures are:
    - Waterless urinals
    - Electronic taps (e-taps)
    - Electronic flush urinals (e-flush)
    - Foam taps
    - Spring loaded push taps
    - Low flush cistern

• **Install sewage treatment plant / rootzone treatment:** VGI uses more than 80,000liters of fresh water per day. Considering that wastage of water 20,000liters is being let to drain without treatment, good opportunity exists to reduce freshwater consumption by treating the sewage

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water and using the recycled water for gardening and flushing application. Install biogas plant and phytoremediation in series to recycle water and reduce freshwater consumption.

• **Install water flow meters:** Water flow meters are vital in understating the water consumption patterns of the campus. Presently, the water consumption is calculated rather than being measured. Water flow meters gives an accurate status if water consumption in the campus and from the water consumption values, the roadmap for water conservation activities can be prepared.

• **Segregate waste at source:** VGI has provided bins for waste collection. VGI must embark on awareness creation methods to increase the effectiveness of collection and provide more bins for proper waste segregation.

• **Maintenance of waste management yard:** The waste management yard is to be maintained just like raw materials storage room. Waste is nothing but a resource in wrong place. Therefore, by maintaining the waste management yard, quality of wastes can be maintained.

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Environmental Audit

VGI and REST are working together to identify opportunities for improvement in water management, and waste management. This report highlights all the potential proposals for improvement through the audit and analysis of the data provided by VGI for water consumption and waste management. The report details the process conducted for the analysis such as on ground surveys performed for listing the type of water consumers with consumption per year, types of waste generated and disposal mechanisms.

Submission of Documents

Environmental audit at VGI was carried out with the help data submitted by VGI team. VGI team was responsible for collecting all the necessary data and submitting the relevant documents to REST Pvt Ltd for the study.

Preliminary Study

After the receipt of documents, a desktop review of the data for quality check, followed by preliminary study was carried out by REST Pvt Ltd. In case of discrepancy/inadequacy/non-clarity of data, REST Pvt Ltd team got in touch with the VGI team for clarification/additional information.

Environmental Audit

Data submitted and collected during the visit was used to assess the water and waste management practices of the campus and finally provide necessary recommendation for environmental improvement.

Note

Environmental audit is based on the data provided by VGI team. The scope of the study does not include the exclusive verification of various regulatory requirements related to environmental sustainability.

REST Pvt Ltd has the right to recall the study, if it finds (a) major violation in meeting the environmental regulatory requirements by the location and (b) occurrence of major accidents, leading to significant damage to ecology and environment.

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Water Conservation

To achieve a water positive status by continuous reduction of freshwater consumption should be the ultimate focus of VGI. Increased and focused attention should be given to attain water sustainability in future by inculcating the discipline of water conservation.

Fresh water consumption of VGI : 80,000 liters per day

Rainwater harvesting : Carried out for campus area

According to the report, 'Water in India: Situation & Prospects', India is the largest consumer of groundwater in the world with an estimated usage of 230 km^3 per year. Approximately 60 per cent of the demand from agriculture and irrigation, and about 80 per cent of the domestic water demand, is met through groundwater. As per the Department of Drinking Water and Sanitation nearly 90 per cent of the rural water supply is from groundwater sources. This has led to an increased pressure on aquifers and the resulting hydrological imbalance.

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Recommendations for water conservation

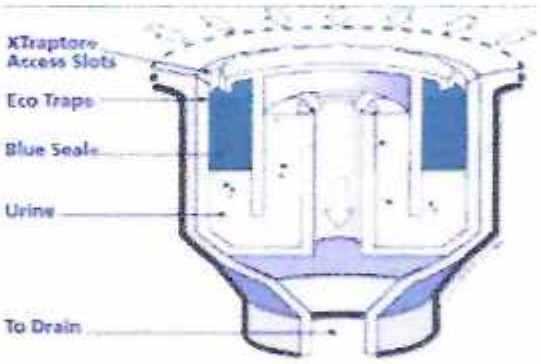
1) Waterless urinals: Waterless urinals look like regular urinals without a pipe for water intake. Men use them normally, but the urinals don't flush. Instead, they drain by gravity. Their outflow pipes conduits to a building's conventional plumbing system. In other words, unlike a composting toilet, which leaves you to deal with your waste, these urinals send the urine to a water treatment plant.

a. Urine flows into the drain insert of the Eco Trap.

b. Inside of the Eco Trap the urine moves through a floating layer of proprietary immiscible Blue Seal liquid, which creates a barrier, preventing sewer gases and urine odours from entering the restroom area.

c. The urine below the Blue Seal barrier overspills into the central tube and travels down into the drain line.

Waterless Urinal



d. Approximately 1500 sanitary uses are possible with just 3 ounces of Blue Seal. When the Blue Seal liquid is gone, it is simply replenished. This only takes about 20 seconds to perform and the Eco Trap is not touched.

e. Urine sediments are retained within the Eco Trap. Replacement is easy and need only be done 2 to 4 times per year depending on traffic to the urinal. As tool called the X-Traptor must be used to remove the Eco Trap. The use of the special tool helps to minimize vandalism. The entire process of replacement only takes 3 to 4 minutes.

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Waterless urinals are available for women. Indian manufacturers are supplying waterless urinals technology. Ekameco is one such company providing solution for women waterless urinals. You may visit www.ekameco.com and mail info@ekameco.com for more details on waterless urinals for women.

2) Volume reduction in flush tanks: One simple method is to add a one-liter equivalent water bottle in the flush tank thereby reducing its consumption majorly. One-liter savings in the tank will help to save approximately by 20% and doesn't require any investment.

3) Rainwater harvesting: Water harvesting or more precisely rainwater harvesting is the technique of collection and storage of rainwater at surface or in subsurface aquifer, before it is lost as surface run off. In artificial recharge, the ground water reservoirs are recharged at a rate higher than natural conditions of replenishment. According to a report by the Central Groundwater Board published in 2007, the selection of a suitable technique for artificial recharge of ground water depends on various factors. They include:

a) Quantum of non-committed surface runoff available

b) Rainfall pattern

c) Land use and vegetation

c) Topography and terrain profile

d) Soil type and soil depth

e) Thickness of weathered / granular zones

f) Hydrological and hydrogeological characteristics

g) Socio-economic conditions and infrastructural facilities available

h) Environmental and ecological impacts of artificial recharge scheme proposed

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Rainwater Harvesting Techniques in Urban Area

In urban areas rainwater is available from roof tops of buildings, paved and unpaved areas. This water could be stored and used to replace freshwater as well as used for recharging the aquifer.

4) Display water balance/conservation status at entrance of all blocks for overall involvement of all students & staff.

It is suggested to display specific water consumption numbers in terms of domestic use at the entrance of each blocks to create awareness among all students and stakeholders visiting the facility. This daily/continuous awareness creation will ultimately help in reduction of water consumption by students.

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Water Saving Gadgets

It is suggested to display specific water consumption numbers in terms of domestic use at the entrance of each block to create awareness among all students and stakeholders visiting the facility. This

Electronic Taps (e-taps)

The latest trend in industries is to install electronic taps (e-taps). The advantages of using e-taps

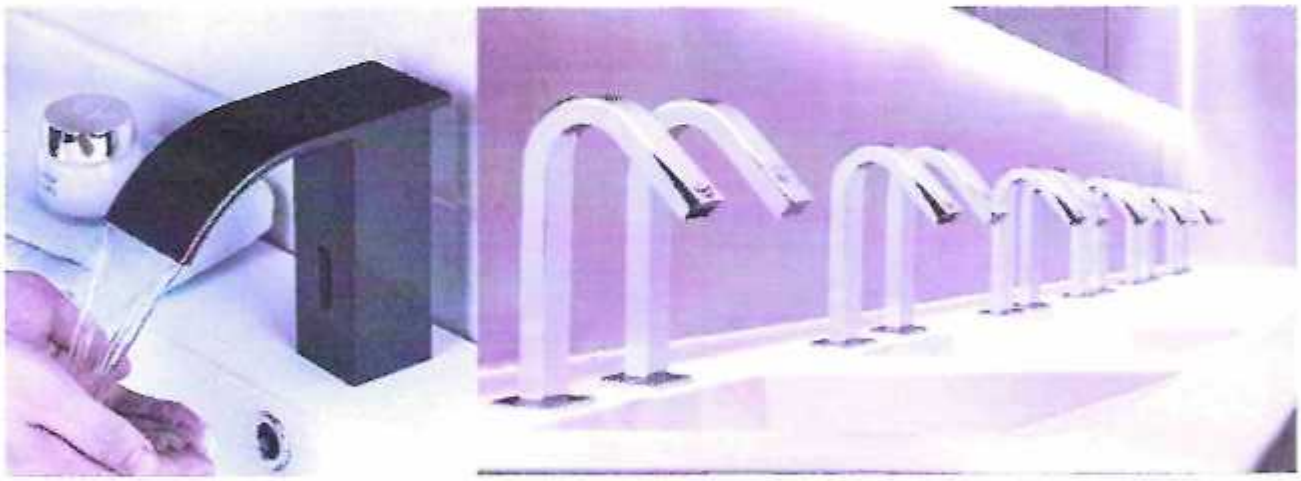
are as mentioned below:

• Unlike conventional taps, there is no twisting or turning in e-taps. They have a sensor, which cuts off water supply completely when not in use. This helps in saving up to 70% water during hand wash.

E-taps enable hands free operation. No fear of cross contamination or contact with germs. E taps score very high on hygiene. It is the most ideal choice for multipurpose and multi-user washrooms.

- E-taps can work efficiently up to raw water TDS of 1,800 ppm.

The touch free electronic taps, available in AC and DC models consume minimal power only. The AC model has an efficient battery back-up, while the DC model runs on just 4 alkaline batteries.



Operation of Electronic Taps

This has been successfully implemented in several hotels & restaurants. Of late, several industries have also started implementing this proposal. Thus, there is a good potential to optimize the Fresh water consumption by replacing the existing taps with e-taps.

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Electronic flush (e-flush) urinals

The latest trend in industries is to install e-flush urinals. The advantages of using e-flush urinals are as mentioned below:

- E-flush urinals are fitted with a sensor, which senses the usage and flush with water for few seconds after use. This helps in saving 70% water during urinal flush.
- E-flush urinals enable hands-free operation and score very high on hygiene. It is the most ideal choice for multipurpose and multi-user washrooms.
- E-flush urinals can work efficiently up to raw water TDS of 1,800 ppm.
- The touch free e-flush urinals available in AC and DC models consume minimal power only. The AC model has an efficient battery back-up, while the DC model runs on just 4 alkaline batteries.

Electronic flush urinals

Hand wash

Foam taps

Conventional taps are used in the hand wash areas which results in wastage of large quantities of fresh water. Foam taps are a better fit in these high consumption areas. They consume 25-30% less water than conventional taps.

Foam taps

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Spring loaded Push taps

Spring loaded push type tap is an alternate device for minimizing hand wash water. The spring-loaded push taps operate with the simple mechanism of pressing the knob for water. The knob is automatically released back to close position in 5-7 seconds. This saves about 30-40% of water compared to the conventional taps.

Spring loaded push taps

Low flush cistern

The latest model closets are water efficient and operate in dual mode, with a single flush releasing 2 litres of water and the dual flush releasing 4 litres per flush. This results in excellent water savings.

Low flush cisterns

Install sewage treatment plant - Rootzone treatment:

VGI uses more than 80,000 lt of fresh water per day. Considering minimum wastage of water 20,000lt is being let to drain without treatment, good opportunity exists to reduce freshwater consumption by treating the sewage water and using the recycled water for gardening and flushing application. Install biogas plant and phytoremediation in series to recycle water and reduce

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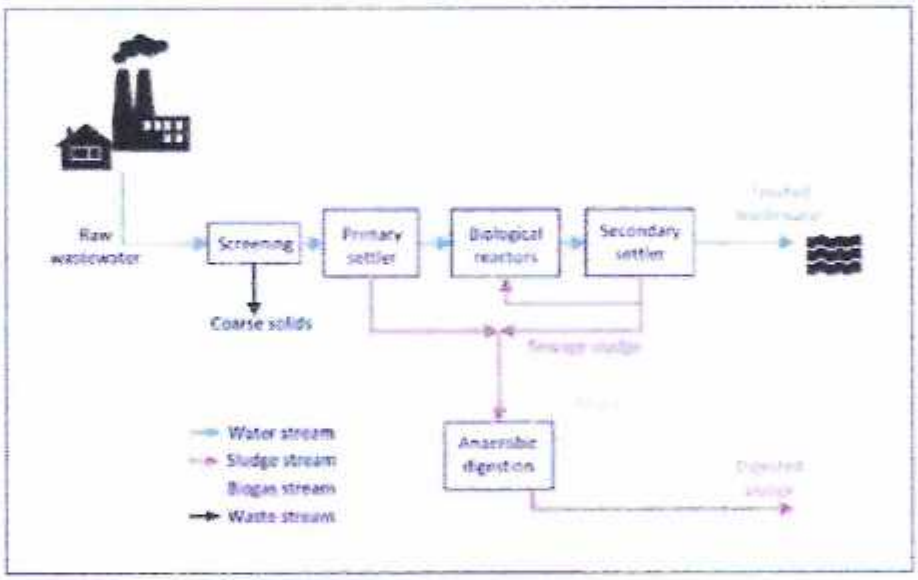
freshwater consumption. VGI has not installed any biogas plant for generating biogas from canteen waste.

Presently, sewage water is being let out to the drain without treatment. An opportunity exists to generate biogas from the untreated sewage water and use the generated biogas to substitute LPG used (200 cylinders/year) in the college.

Biogas Production Potential of Wastewater

The sewage water is a useful waster as 1% of it in any quantity is a sludge which when subjected to anaerobic digestion will produce biogas. Wastewater is the effluent from household, commercial establishments and institutions, hospitals, industries and so on. Sewage water source contains large amount of organic material which can be efficiently recovered in as sludge which and when subjected to anaerobic digestion, the sludge produces methane gas (biogas).



Biogas is a mixture of gases containing 50-75% Methane, and 25-50% Carbon dioxide while 0-10% Nitrogen, 0-3% Hydrogen disulphide and 0-2% Hydrogen may be present as impurities which is produced by anaerobic digestion of organic material i.e. a sequential enzymatic breakdown of biodegradable organic material (Biomass) in the absence of oxygen. The process is usually carried out in a digester tank known as biodigester. Biogas is an important energy source used as cooking gas, to generate electricity, etc. thus producing biogas from wastewater is an efficient and sustainable waste management and renewable energy technique. One of the major environmental problems of the world today is waste management and wastewater constitutes a huge environmental problem to the society thus the need for wastewater treatment to recover and also recycle the recovered water for usage.

The physical process: this is the mechanical treatment of the water that involves removal of debris from the raw wastewater right from the point it enters the plant. The screening and primary settling of debris. Wastewater enters the treatment plant through the inlet chamber from where it is channelled to the coarse screen that removes solid waste.

The biological process: this involve the biotreatment of the sewage in the bioreactors. It is the heart of the treatment plant where a biological process takes place. The bioreactors of a treatment plant are usually large tanks consisting of several mammoth rotors and submersible mixers. While

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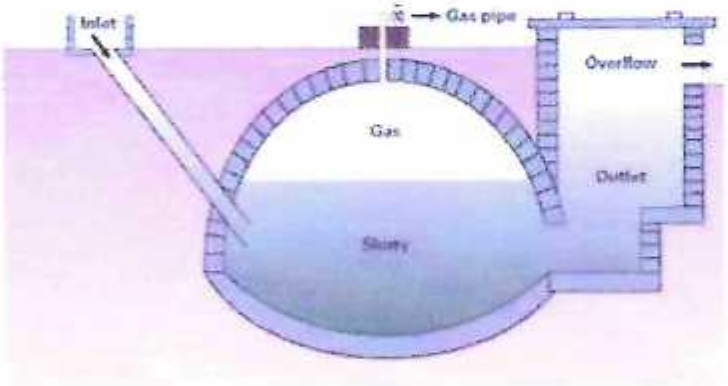
the rotor introduces atmospheric oxygen into the sewage, the submersible mixers keep the biomass in suspension thus several reactions take place in the bioreactors.

From the bioreactor, the sewage enters the sedimentation tank. Here the biological process ends and sludge is separated from water such that the clean water is passed to the disinfection tank for disinfection and onward discharge for use while the sludge is removed by the returned activation sludge (RAS) pump that removes and sends part to the anaerobic digestion chamber while some e return to the anaerobic bioreactor for reactivation.

Production of biogas is an anaerobic digestion whereby microorganisms break down biodegradable material in the absence of oxygen to produce methane/carbon dioxide used to generate electricity and heat. Sludge from the treatment plant (primary and activated sludge) is the main feedstock (biodegradable organic matter) in the biogas production plant of a wastewater treatment plant and the biogas production process involves series of steps. The combine sludge resulting from primary and secondary water treatment is gathered, sieved and thickened to a dry solids content of up to 7% before entering the digesters. Optionally, the sludge can be pre-treated by disintegration technologies with the aim to improve the gas yield. In the anaerobic digestion process, the sludge is pumped into the anaerobic continuously stirred tank reactors where digestion takes place. In the process, microorganisms break down part of the organic matter that is contained in the sludge and produce biogas, which is composed of methane, carbon dioxide and trace gases. The raw biogas produced is dried and hydrogen sulphide and other trace substances removed and burned in burners after treatment. The digested sludge is dewatered, and the water reintroduce into the treatment plant while the remaining undigested matter used for organic fertilizer.



Rootzone treatment:

Root Zone' is a scientific term used to cover all the biological activity among different types of microbes, the roots of plants, water soil and the sun. It consists planted filter-beds containing ravel, sand and soil. The RZWT system utilises nature's way of biologically processing domestic & industrial effluents. This effective technology called Decentralised Wastewater Systems (DEWATS) was developed in 1970s in Germany and has been successfully implemented in different countries mainly in Europe and America.

The root zone wastewater treatment system makes use of biological and physical-treatment processes to remove pollutants from wastewater. Due to its natural process, there is no need to

add any input such as chemicals, mechanical pumps or external energy. This reduces both the maintenance and energy costs.

• To accomplish this, the root zone wastewater treatment undertakes the following steps:

• Pre-treatment done in a Settler - a device that separates the liquid from the solid First treatment takes place in a Anaerobic Baffled Reactor - a device with several identical chambers through which the effluent moves from top to bottom.

• Second treatment happens in an Anaerobic Filter - a device filled with a filter material (cinder), through which the effluent moves from top to bottom.

Third treatment takes place in a Planted Gravel Filter - a structure filled with gravel material and planted with water-resistant reed plants, which provide oxygen to the passing effluent.

The Root Zone Wastewater Treatment system takes into account the natural slope of the ground, so that water flows from one device to another without any ternal energy input such as motor pump. Once the reed plants create an established stand, usually after the first growing season, the reed bed requires little or no maintenance. The plant foliage will soon blend naturally into the landscape, ever changing with the seasons and creating a pleasing sight as well!

Install water flow meter:

Water flow meters are vital in understating the water consumption patterns of the campus. Presently, the water consumption is calculated rather than being measured. Water flow meters gives an accurate status if water consumption in the campus and from the water consumption values, the roadmap for water conservation activities can be prepared.

Water Meters would have many advantages:

- Encourage water conservation - important given strain on water resources
- Encourage allocatively efficient distribution. People would consume to where the marginal cost = marginal utility

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- In long term lower overall water consumption would reduce leading to even lower water bills.

Waste Management

India has drawn world's attention with its high paced urbanization and industrialization. Over the last decade, India has emerged as the fastest growing country with rapid economic growth. A renewed focus on sustainable growth and development is imperative as India strives to maintain its high GDP growth rate in its pursuit of achieving developed country status by the year 2022. However, the flip side of higher economic growth has resulted in increased consumption of the natural resources, increased waste generation and hence ecological degradation.

Present status: VGI has initiated waste management activities inside its facility. Separate bins have been provided for different types of wastes. Waste bins are provided throughout the campus and students are being urged to use the bins effectively.

Recommendation: The waste management yard must be maintained in a similar fashion as that of a raw material storage room. Therefore, a total revamp of the waste storage yard is to be carried out. By doing so, the quality of the materials stored in the yard will not deteriorate and can be used a raw material for a subsequent process.

Enhance awareness creation, training and capacity building

VGI should focus on implementing sustainable waste management practices. VGI should regularly interact with Pollution Control Board and TSDF operators to enhance knowledge on waste management. The team should also take efforts to communicate the waste management and other policies and activities to all students in the college.

Achieve zero liquid discharge status

VGI may install a STP to treat and recycle water. The treated water from STP can be used to substitute freshwater by utilizing the treated water in both high end and low-end applications.

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Conclusion

Environmental sustainability is a continuous process and there is always a scope for improvement. VGI has displayed itself as an advocate of environmental sustainability by getting environmental audit carried out. The organization has implemented several initiatives and measures to enhance efficiency and to optimize resource intensity. The journey ahead in the path towards environmental excellence has immense scope for improvement as brought out by this report.

VGI needs to focus and work on areas efficiency levels needs to be enhanced. For example: waste management. The observations and suggestions put forth by the report would help the facility in improving its environmental performance and pave way for ecologically sustainable growth.

This report may be taken as a guide and roadmap for achieving higher performance rating in environmental stewardship. As one of the pioneers and leaders VGI shoulder the task of further 'learning-teaching-learning' to improve, excel, and continue the innovative efforts for success of their students and associates.

*****

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CERTIFICATE *OF* COMPLETION

This is to certify that

Vikas Group of Institutions

---

has successfully completed

GREEN LAND SCAPE AUDIT

The study was completed by Rekhapalli Environmental Solutions & Technologies Pvt Ltd

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VIKAS GROUP OF INSTITUTIONS
NUNNA - 521 212
Vijayawada Rural, NTR Dist., A.P.

Dr Rekhapalli Srinivasa Rao

Green, Eco & Energy Lead Auditor
Certified ISO-14001 Auditor

Issued by

Rekhapalli Environmental Solutions & Technologies Pvt Ltd

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VIKAS GROUP OF INSTITUTIONS

NUNNA, VIJAYAWADA RURAL, NTR DISTRICT, A.P- 521212

Green Landscape Audit

PRINCIPAL/DIRECTOR
VIKAS GROUP OF INSTITUTIONS
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CONTENTS

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NUNNA - 521 212
Vijayawada Rural, NTR Dist., A.P.

Acknowledgements

REST Pvt Ltd

Dr Rekhapalli Srinivasa Rao
Green, Eco & Energy Lead Auditor
Certified ISO-14001 Auditor

20 January 2023

Green Landscape Audit

The REST Pvt Ltd acknowledges with thanks the cooperation extended to our team for completing the study at Vikas Group of Institutions (VGI).

The interactions and deliberations with VGI team were exemplary and the whole exercise was thoroughly a rewarding experience for us. We deeply appreciate the interest, enthusiasm, and commitment of VGI team towards environmental sustainability.

We are sure that the recommendations presented in this report will be implemented and the VGI team will be further improve their environmental performance.

Kind regards

Your sincerely

Dr Rekhapalli Srinivasa Rao

Green, Eco & Energy Lead Auditor
Certified ISO-14001 Auditor
REST Pvt Ltd

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VIKAS GROUP OF INSTITUTIONS
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Executive Summary

The growth of countries across the world is leading to increased consumption of natural resources. There is an urgent need to establish environmental sustainability in every activity we do. In a modern academy, environmental sustainability will play a critical role in the very existence of an organization.

An educational institution is no different. Built environment, especially an educational institution, has a considerable foot print on the environment. Impact on the environment due to energy consumption, water usage and waste generation in an educational institution is prominent. Therefore, there is an imminent need to reduce the overall environmental footprint of the institution.

As an institution of higher learning, Vikas Group of Institutions (VGI) firmly believes that there is an urgent need to address the environmental challenges and improve their environmental footprint.

True to its belief, VGI maintain a good landscaping in its campus. The whole campus is lush green, and trees are seen everywhere around the campus. REST congratulates the VGI for their efforts to create a truly green campus.

Based on the data submitted by VGI team, following improvement opportunities have been identified in the campus in terms of landscaping.

- Implement ecosystem restoration by development of theme gardens in used areas of the campus
- Develop green corridors between existing areas in the campus
- Develop natural areas to encourage bird roosting and nesting in built-up areas
- Increase tree density and canopy cover in the built-up areas by planting more fruit yielding trees.
- Conduct regular flora surveys for improving the existing data
- Develop strategies for regular monitoring prevention of invasive plant species.

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By addressing the improvement opportunities, the campus would be able to achieve the following benefits:

- Identifying & implementation of proper measure for conservation of endangered floral species in the campus
- Reduce the microclimate temperature of the campus by 1-2°C which is significant
- As many of the species have the capability to absorb contaminants in the air and therefore this would lead to better air quality in the campus
- This can evolve as an excellent educational campus for spreading awareness on biodiversity and benefit the nation at large.

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Introduction

Urbanisation and its effect on loss of biodiversity

Urbanization causes biodiversity to decline. As cities grow vital habitat is destroyed or fragmented into patches not big enough to support complex ecological communities. In the city, species may become endangered or even locally extinct as natural areas are swallowed up by the urban jungle.

Ironically, it is urban growth that is often responsible for the introduction of non-native species, either accidentally or deliberately, for food, pets or for aesthetic reasons.

Documentation of Flora

Knowledge on biodiversity of any geographical region is a paramount importance for sustainable management and conservation plans. The fore most task in the conservation process is to prepare an inventory of species. It is necessary to have full knowledge regarding the habit, habitat, distribution and phenology of various plants for their proper conservation.

The documentation of flora will help in identifying, documenting and promoting the conservation of native flora in India. This in turn will help in promoting native species for landscapes as they suit one growing interest in "Low maintenance" gardening and landscaping.

Many species are vigorous & hard and can survive winter, cold, and summer heat. These species once established, can flourish without irrigation or fertilization and are resistant to most pets & diseases.

Need for documentation of Flora

The knowledge building on significance and importance of various flora existing around us is the need of the hour. Loss of the biodiversity is likely to result in loss of various other taxonomic groups.

Serve as a ready reckoner:

Most of the campuses have huge landscape with diverse floral species. Nevertheless, the availability of information on these species is minimal. Hence, the documentation of the species would serve as an educational material on the details of species existing within the campus.

Public Visibility:

Despite having various biodiversity initiatives in place within the campus most of the campuses lack the visibility of the measures taken in conservation. The sudsy will create awareness & visibility of the campus on various conservation measures implemented to the occupants as well as to the visitors.

Also, the organization will gain globally amongst its shareholders for the positive steps taken towards protecting biodiversity.

Conservation of Species:

Due to Urbanization most of the floral species are under tremendous pressure. The need of the houris to conserve and protect these species. The study would help in identifying such species in the campus which need to be conserved.

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VGI carbon sequestration through plantation

Carbon sequestration through plantation is one of the important steps towards achieving carbon neutrality. In carbon footprint calculation of VGI, carbon sequestration through plantation is considered and due credit has been given.

No. of trees considered for carbon footprint calculation	: 80 trees
CO2 absorbed by a tree in one year	: 18 KG
Total CO2 sequestrated	: 80 trees x 18 KG of CO2/year
	: 1440 KGS of CO2

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Plantation & Maintenance techniques

Selection of species

- Native species like Azadirachta indica (Neem), Pongamia pinnata (Pongam tree), Cassia fistula (Indian shower tree), Butea monosperma (Flame of the forest) and also fruit bearing species like Mangifera indica (Mango), Manilkara sapota (Chikoo), Syzygium cumini (Jamun Tree), Psidium guajva (Guava), Annona squamosal (Custard apple), Punica granatum (Pomegranate), Phyllanthus emblica (Indian Gooseberry), Citrus sinensis (Sweet lime) and Citrus limon (Lime) to be selected for plantation.
- Saplings of 2-3 ft height to be considered for plantation in public areas
- Plantation can be taken up as avenues (roadside plantation) and green belts (thick plantation in one area)
- Fruit plantation can be taken up in protected areas, institutions with large areas. Special care to be taken in maintenance since these plants also generate revenue

Digging of pits

Pits to be dug about one month prior to the plantation date and it should be exposed to sunlight

This will help in killing of harmful disease-causing bacteria and virus.

1. In places of no availability of proper sunlight, dry trash to be filled in the pit and burnt.

2. Pit size should be normally 2ft or 3ft and in soils which are very hard $4ft^3$ or above to be dug.

3. Further to the digging of pit, the bottom of the pit should be loosened up to 6-9 inches.

4. While digging, we can observe different soil profiles. Topsoil will be soft and contains enough nutrients for nourishing the plant. The topsoil should be deposited on one end and hard soil on the other end. While filling the pit with soil, the topsoil only should be used. The topsoil from the non-plantation area around the pit to be collected and mixed with manure and used for filling of the pit.

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Transportation

- Visit to the nurseries and enquire about plant species like availability, size, age and girth prior to the plantation. Also, the size of the packet in which the plant is existing to be enquired.
- Ensure that the material is available in the nursery and allotted to pick up
- The saplings to be watered one or two days prior to the movement of plants to plantation area
- The plants to be procured at least 15 days prior to plantation.
    - The saplings to be watered as soon as they reach the plantation area and regularly thereafter.
    - They should be kept in shade, non-windy & protected areas.

The above said steps to be followed for movement of plants near to the pits within the plantation area. Enough water to be stored for watering the plants after plantation. Also, tools and manpower to be kept in place to ensure proper plantation of saplings. If the sapling is bushy with many branches, then the branches are to be trimmed before plantation.

Plantation

- The poly bag around the root ball to be carefully cut with a knife / sickle / scissors without disturbing the roots
- Rope and stakes are to be kept ready to support the plant after plantation.
- Regular watering to be done to the plants followed by mulching (loosening of top 3-4 inches of soil)
- Mulching will help in conservation of moisture, aeration of roots and control of weeds.
- Note: At least 5% of extra plants to be procured for timely gap filling and to ensure 100% survival. Care to be taken for these plants like other plants.

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Recommendations for Enhancing Flora in Campus

1. Implement Ecosystem Restoration

- Develop naturalised areas in the Open Area segments
    - Wastelands in the campus can be converted to a park
- 'Theme Gardens' can be developed in unused areas of the campus to increase proportion of natural area

2. Enhance Ecosystem Protection

- Protect and maintain the existing Open Area segments

3. Planting more fruit yielding trees

- Increase tree density and canopy cover in the built-up areas

4. Increase number of Native Plants in the Landscape area

- Increase native plants to boost native biodiversity
    - Bees, butterflies and other insects
- Healthy native plant growth will help in easy identification of invasive alien species

5. Introduce more native species in Open Areas

6. Preventing/ Decreasing Invasive Alien Species Spread

- Identify potential threatening species in advance and implement quarantine measures
- Mass Eradication techniques for larger spreads
- Commitment to complete eradication
- Manual Uprooting of small populations

7. Develop natural areas to encourage bird roosting and nesting in built-up areas

8. Introduce features to attract birds in the built-up areas

- Bird feeders
- Water troughs/ Bird baths
- Nesting material

9. Improve measures for rainwater harvesting in paved and un-paved areas

- Open fields, parks, pavement landscapes, etc.
- Develop outdoor parks in open areas

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Conclusion

As seen in the carbon sequestration calculation, tree plantations lead to a tremendous reduction in net emissions of the campus. Therefore, VGI needs to develop a roadmap to include tree plantation as a strategy to reduce overall carbon emissions of the campus.

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