FOUNDED 1953

NIRMALA COLLEGE
MUVATTUPUZHA

Muvattupuzha P. O., Ernakulam Dist., Kerala - 686 661
Telephones:0485 2832361, 2836300
e-mail:nirmalacollege@gmail.com, Website: www.nirmalacollege.ac.in

FOURTH CYCLE NAAC ACCREDITATION 2019

CRITERION 6

GOVERNANCE, LEADERSHIP AND MANAGEMENT

6.5.4 Quality assurance initiatives of the institution include:

Submitted to

THE NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

CRITERION 6

GOVERNANCE, LEADERSHIP AND MANAGEMENT

6.5.4 Quality assurance initiatives of the institution include:

National Assessment and Accreditation Council

An Autonomous Institution of the University Grants Commission

Bangalore

CERTIFICATE OF ACCREDITATION

The Executive Committee of the

National Assessment and Accreditation Council

on the recommendation of the duly appointed

Peer Team, is pleased to declare the

***Nirmala College**, Muvattupuzha,*

affiliated to the Mahatma Gandhi University, Kerala, as

Accredited[1]

at the Three star level[2]*.*

(among the Affiliated/ Constituent Colleges)

Date: February 07, 2000

Chairman

1. This certification is valid for a period of 5 years with effect from the assessment academic year 1999-2000.
2. An institutional score (%) in the range of *55-60* denotes one star, *60-65* two stars, *65-70* three stars, *70-75* four stars, and *75 and above* five stars (upper limit exclusive).

राष्ट्रीय मूल्यांकन एवं प्रत्यायन परिषद

विश्वविद्यालय अनुदान आयोग का स्वायत्त संस्थान

NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

An Autonomous Institution of the University Grants Commission

Certificate of Accreditation

The Executive Committee of the
National Assessment and Accreditation Council
on the recommendation of the duly appointed
Peer Team is pleased to declare the

Nirmala College

Muvattupuzha, Dist. Ernakulam

affiliated to Mahatma Gandhi University, Kerala as

Accredited

at the B++ level.

Date : March 31, 2007

Director

- This certification is valid for a period of Five years with effect from March 31, 2007
- An institutional score (%) in the range of 55-60 denotes C grade, 60-65-C+ grade, 65-70-C++ grade, 70-75- B grade, 75-80- B+ grade, 80-85-B++ grade, 85-90- A grade, 90-95-A+ grade, 95-100-A++ grade (upper limits exclusive)

राष्ट्रीय मूल्यांकन एवं प्रत्यायन परिषद

विश्वविद्यालय अनुदान आयोग का स्वायत्त संस्थान

NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

An Autonomous Institution of the University Grants Commission

Certificate of Accreditation

The Executive Committee of the
National Assessment and Accreditation Council
on the recommendation of the duly appointed
Peer Team is pleased to declare the
Nirmala College
Muvattupuzha, Dist. Ernakulam, affiliated to Mahatma Gandhi University,
Kerala as
Accredited
with CGPA of 2.85 on four point scale
at B grade
valid up to March 22, 2018

Date : March 23, 2013

Director

Ministry of Human Resource Development
Government of India

nirf

National Institutional Ranking Framework

India Rankings 2017

Nirmala College, Ernakulam

ranked **91** in **College** Category

CHAIRMAN, NBA

MEMBER SECRETARY, NBA

Submitted Institute Data for National Institute Ranking Framework (NIRF)
Institute ID: IR17-COLL-2-18887 (COLLEGE)
Institute Name: Nirmala College

Faculty Details

No. of Faculty members with Ph.D qualification	Total no. of Faculty members	No. of Women Faculty members
37	83	44

Student Details

Academic Year	Program Level	Approve Intake of all years of duration	No. of Male students studying in all years of all programs	No. of Female students studying in all year of all programs	Total no.of students studying in all years of all programs	No. of students from Within the State	No. of students from Outside State	No. of students from Outside Country	No. of students from Economically Backward Class	No. of students from Socially Challenged Category (SC, ST & OBC)
2015-16	UG	760	803	1303	2106	2106	0	0	0	621
2015-16	PG	199	162	381	543	543	0	0	0	128
2015-16	PHD	65	26	39	65	65	0	0	0	3

Placement and Higher Studies

Academic Year	Program	No. of students placed through campus placement	No. of students selected for Higher Studies	Median salary of placed graduates (in Rs.)
2015-16	PG [2 Years]	5	5	228000
2015-16	PG [3 Years]	1	0	180000
2015-16	UG [3 Years]	87	95	180000

University Exam Details

Academic Year	Program	No. of students admitted in the first year	No. of students admitted through lateral entry	No. of students graduating in minimum stipulated time
2015-16	PG [2 Years]	225	0	152
2015-16	PG [3 Years]	60	0	57
2015-16	UG [3 Years]	755	0	430

Financial Resources and its Utilization

Financial Year	Annual Capital Expenditure (in Rs.)	Annual Operational Expenditure (in Rs.)	Total Annual Expenditure (in Rs.)
2013-14	7866000.00	91593356.00	99459356.00
2014-15	3934000.00	111005575.00	114939575.00
2015-16	1520000.00	90984518.00	92504518.00

Publication Details (For last 3 calendar years, i.e. 2013, 2014, 2015) (Source of data - Clarivate Analytics, Elsevier B.V. and Indian Citation Index.)

Source of Data	Publications	Citations	Top 25 % Highly Cited Papers
Web of Science	10	40	0
Scopus	25	81	0

Source of Data	Publications	Citations
Indian Citation Index	1	0

Facilities for Physically Challenged Students

Do your institution have Lifts/Ramps ?	Do your institution have provision for walking aids, including wheelchairs and transportation from one building to another for handicapped students?	Do your institution have specially designed toilets for handicapped students?
Yes, in some of the buildings	No	No

Perception Details

Peer Perception	Employer Perception	Public Perception
0	0	43

NIRMALA COLLEGE
Muvattupuzha, Ernakulam

Team Six <team6@nirmalacollege.ac.in>

Fwd: INDIA RANKINGS 2017 Registration

1 message

Nirmala College Muvattupuzha <nirmalacollege@gmail.com> Wed, Jan 29, 2020 at 6:40 PM
To: team6@nirmalacollege.ac.in

---------- Forwarded message ---------
From: **Dr.T. M.Jacob** <tmjacob@gmail.com>
Date: Fri, 30 Sep 2016 at 13:02
Subject: Fwd: INDIA RANKINGS 2017 Registration
To: Nirmala College Muvattupuzha <nirmalacollege@gmail.com>, IQAC Nirmala College Muvattupuzha <iqac@nirmalacollege.ac.in>, drsubynirmala@yahoo.com <drsubynirmala@yahoo.com>

---------- Forwarded message ----------
From: <noreply@nirfindia.org>
Date: Fri, Sep 30, 2016 at 12:08 PM
Subject: INDIA RANKINGS 2017 Registration
To: tmjacob@gmail.com

Dear Sir/Madam ,

Greetings from INDIA RANKINGS 2017 !

Thanks for registering at NIRF portal.

Click/Copy link to active your account: http://nirfweb.cloudapp.net/Activate.aspx?random=d9iWScDR

Following is/are your institute's INDIA RANKINGS 2017 ID[s] IR17-I-2-18887,IR17-COLL-2-18887

Credentials of your account are as follow:

Institute Name: Nirmala College

Username:[Your Institute id of Respective Disclipline].

Password: d9iWScDR

After first login you may change your password, however your login will remain same.

Data Submission portal for India Rankings 2017 opens on 10th October 2016.

Please note: This is an auto generated email. In case of any queries please contact: helpdesk[at]nirfindia[dot]org

Regards,
Team NIRF

--
Dr.T.M.JACOB
+91 9447003905
Google Location map

NIRMALA COLLEGE
Muvattupuzha, Ernakulam

Team Six <team6@nirmalacollege.ac.in>

Fwd: India Rankings 2018 - Scores

1 message

Nirmala College Muvattupuzha <nirmalacollege@gmail.com> Wed, Jan 29, 2020 at 6:42 PM
To: team6@nirmalacollege.ac.in

---------- Forwarded message ---------
From: **INDIA RANKINGS** <no_reply@nirfindia.org>
Date: Tue, 14 Aug 2018 at 20:37
Subject: India Rankings 2018 - Scores
To:

Dear Sir/Ma'am,

Greengs fr om NIRF!

Thank you for parcipa ng in India Rankings 2018. It has been decided t o provide scores to each instuon. Y ou can login through your credenals (pr ovided during DCS) to view your score ll 18th Augus t, 2018. If you are not able to login, please contact 07923268247/89 or mail to techsupport@nirfindia.org.

Please do not respond directly to this e-mail. The originang e-mail acc ount is not monitored.

Regards,
Team NIRF

NIRMALA COLLEGE
Muvattupuzha, Ernakulam

Team Six <team6@nirmalacollege.ac.in>

Fwd: India Rankings 2019 - Scores

1 message

Nirmala College Muvattupuzha <nirmalacollege@gmail.com> Wed, Jan 29, 2020 at 6:42 PM
To: team6@nirmalacollege.ac.in

---------- Forwarded message ---------
From: **INDIA RANKINGS** <noreply@nirfindia.org>
Date: Mon, 6 May 2019 at 12:50
Subject: India Rankings 2019 - Scores
To: drsubybaby@nirmalacollege.ac.in <drsubybaby@nirmalacollege.ac.in>
Cc: nirmalacollege@gmail.com <nirmalacollege@gmail.com>

Dear Sir/Ma'am,

Greetings from NIRF!

Thank you for participating in India Rankings 2019.

The broad parameter wise score of your institution is available in the DCS. You can login through your credentials (provided during Data Filling in DCS) to view your score till 17th May, 2019. Post deadline, no request will be considered. If you are not able to login, please contact 07923268247/89 or mail to techsupport@nirfindia.org.

Please do not respond directly to this e - mail.The originating e-mail account is not monitored.

Regards,
Member Secretary, NIRF

National Institutional Ranking Framework

Ministry of Human Resource Development

Government of India

Welcome to Data Capturing System: COLLEGE

Submitted Institute Data for NIRF'2020'

Institute Name: Nirmala College, Muvattupuzha - 686 661 [IR-C-C-11839]

Sanctioned (Approved) Intake

Academic Year	2018-19	2017-18	2016-17	2015-16	2014-15	2013-14
UG [3 Years Program(s)]	654	654	654	-	-	-
PG [2 Year Program(s)]	239	239	-	-	-	-

Total Actual Student Strength (Program(s) Offered by Your Institution)

(All programs of all years)	No. of Male Students	No. of Female Students	Total Students	Within State (Including male & female)	Outside State (Including male & female)	Outside Country (Including male & female)	Economically Backward (Including male & female)	Socially Challenged (SC+ST+OBC Including male & female)	No. of students receiving full tuition fee reimbursement from the State and Central Government	No. of students receiving full tuition fee reimbursement from Institution Funds	No. of students receiving full tuition fee reimbursement from the Private Bodies	No. of students who are not receiving full tuition fee reimbursement
UG [3 Years Program(s)]	920	1282	2202	2174	22	6	1300	324	364	30	0	1230
PG [2 Year Program(s)]	110	414	524	511	13	0	360	58	73	15	0	330

Placement & Higher Studies

UG [3 Years Program(s)]: Placement & higher studies for previous 3 years

Academic Year	No. of first year students intake in the year	No. of first year students admitted in the year	Academic Year	No. of students graduating in minimum stipulated time	No. of students placed	Median salary of placed graduates(Amount in Rs.)	No. of students selected for Higher Studies
2014-15	769	752	2016-17	436	120	360000(Three lakh Sixty Thousand)	225
2015-16	740	688	2017-18	512	213	480000(Four Lakh Eighty Thousand)	279
2016-17	654	696	2018-19	564	50	150000(One lakh fifty thousand)	366

PG [2 Years Program(s)]: Placement & higher studies for previous 3 years

Academic Year	No. of first year students intake in the year	No. of first year students admitted in the year	Academic Year	No. of students graduating in minimum stipulated time	No. of students placed	Median salary of placed graduates(Amount in Rs.)	No. of students selected for Higher Studies
2015-16	229	225	2016-17	178	50	490000(four lakh ninety thousand)	12
2016-17	199	192	2017-18	179	90	510000(five lakh ten thousand)	27

2017-18	239	266	2018-19	226	80	190000(One lakh ninety thousand)	53

Financial Resources: Utilised Amount for the Capital expenditure for previous 3 years

Academic Year	2018-19	2017-18	2016-17
	Utilised Amount	Utilised Amount	Utilised Amount
Annual Capital Expenditure on Academic Activities and Resources (excluding expenditure on buildings)			
Library	916946 (Nine Lakh Sixteen Thousand Nine Hundred Forty Six)	1237377 (TWELVE LAKH THIRTY SE VEN THOUSAND THREE HUNDRED AND SEVENTY SEVEN)	36440 (THIRTY SIX THOUSAND FOUR HUNDRED AND FORTY)
New Equipment for Laboratories	1841653 (Eighteen Lakh Forty One Thousand Six Hundred Fifty Three)	4205119 (FORTY TWO LAKH FIVE T THOUSAND ONE HUNDRED AND NINETEEN)	1087182 (TEN LAKH EIGHTY SEVEN THOUSAND ONE HUNDRED AND EIGHTY TWO)
Other expenditure on creation of Capital Assets (excluding expenditure on Land and Building)	5024036 (Fifty Lakh Twenty Four Thousand Thirty Six)	73493650 (SEVEN CRORE THIRTY F OUR LAKH NINETY THREE THOUSAND AND SIX FIFTY)	2373188 (TWENTY THREE LAKH SEVENTY THREE THOUSAND ONE HUNDRED AND EIGHTY EIGHT)

Financial Resources: Utilised Amount for the Operational expenditure for previous 3 years

Academic Year	2018-19	2017-18	2016-17
	Utilised Amount	Utilised Amount	Utilised Amount
Annual Operational Expenditure			
Salaries (Teaching and Non Teaching staff)	119151867 (Eleven Crore Ninety One Lakh Fifty One Thousand Eight Hundred Sixty Seven)	14132290 (FOURTEEN CRORE SEVENTY ONE LAKH THIRTY TWO THOUSAND TWO HUNDRED AND NINE TY)	13878430 (THIRTEEN CRORE EIGHT Y SEVEN LAKH EIGHT THOUSAND F OUR HUNDRED AND THIRTY)
Maintenance of Academic Infrastructure or consumables and other running expenditures(excluding maintenance of hostels and allied services,rent of the building, depreciation cost, etc)	13131129 (One Crore Thirty One Lakh Thirty One Thousand One Hundred Twenty Nine)	6026668 (SIXTY LAKH TWENTY SIX THOUSAND SIX HUNDRED AND SIXTY EIGHT)	945120 (NINE LAKH FORTY FIVE TH OUSAND ONE HUNDRED AND TWENTY)
Seminars/Conferences/Workshops	1337484 (Thirteen Lakh Thirty Seven Thousand Four Hundred Eighty Four)	717854 (SEVEN LAKH SEVENTEEN THOUSAND EIGHT HUNDRED AND FIFTY FOUR)	510030 (FIVE LAKH TEN THOUSAND AND THIRTY)

PCS Facilities: Facilities of physically challenged students

1. Do your institution buildings have Lifts/Ramps?	Yes, more than 80% of the buildings
2. Do your institution have provision for walking aids, includingwheelchairs and transportation from one building to another for handicapped students?	Yes
3. Do your institution buildings have specially designed toilets for handicapped students?	Yes, more than 80% of the buildings

Awards Details

1.How many faculty member of your institution have received highly reputed national/international awards/recognition from central government agencies in the previous academic year 2018-19	0
2.How many students of your institution have won international awards in the previous academic year 2018-19	0

Accreditation

NAAC Accreditation

1. Does your institute have a valid NAAC Accreditation?	YES	
Valid from	**Valid upto**	**CGPA**

30-11-2019	29-11-2023	2.76

Village Adoption

Have your institute adopted any village under Unnat Bharat Scheme?	YES

Faculty Details

Srno	Name	Age	Designation	Gender	Qualification	Experience (In Months)	Is Associated Last Year	Currently working with institution?	Joining Date	Leaving Date	Association type
1	ALOYSIUS SABU N	53	Associate Professor	Male	Ph.D	286	Yes	Yes	11-09-1995	--	Regular
2	SUBY BABY	40	Assistant Professor	Female	Ph.D	144	Yes	Yes	11-04-2012	--	Regular
3	JULIYA EMMANUEL	37	Assistant Professor	Female	Ph.D	132	Yes	Yes	01-12-2010	--	Regular
4	ANI KURIAN	41	Assistant Professor	Female	Ph.D	106	Yes	Yes	08-02-2013	--	Regular
5	THOMAS VARGHESE	54	Associate Professor	Male	Ph.D	322	Yes	Yes	10-05-1995	--	Regular
6	GIGI K JOSEPH	49	Assistant Professor	Male	Ph.D	151	Yes	Yes	01-12-2010	--	Regular
7	PRIYA K DEV	35	Assistant Professor	Female	NET	72	Yes	Yes	01-07-2014	--	Regular
8	AJOMY MARIA JOSEPH	30	Assistant Professor	Female	NET	60	Yes	Yes	14-07-2014	--	Regular
9	J GEORGI NEERNAL	56	Associate Professor	Male	Ph.D	154	Yes	Yes	01-08-1996	--	Regular
10	Sr Jinto John	39	Assistant Professor	Female	NET	59	Yes	Yes	01-06-2015	--	Regular
11	Raison J Mathews	39	Assistant Professor	Male	MCA	182	Yes	Yes	01-09-2005	--	Regular
12	SMITHA ANU THOMAS	41	Lecturer	Female	M. Phil	180	Yes	Yes	16-01-2006	--	Regular
13	NIRMALA GEORGE	57	Associate Professor	Female	M.Sc.	394	Yes	Yes	03-10-1985	--	Regular
14	SOPHY THOMAS	57	Associate Professor	Female	M. Phil	406	Yes	No	07-02-1985	29-03-2019	Regular
15	TITU THOMAS	30	Assistant Professor	Male	NET	43	Yes	Yes	28-12-2015	--	Regular
16	ANNS MARIA THOMAS	31	Assistant Professor	Female	NET	43	Yes	Yes	28-12-2015	--	Regular
17	BABY JOSEPH	60	Lecturer	Male	M.Sc.	420	Yes	Yes	01-06-2015	--	Regular
18	DIVYA RAJAN	32	Assistant Professor	Female	MCA	93	Yes	Yes	01-12-2011	--	Regular
19	James Mathew	55	Associate Professor	Male	Ph.D	314	Yes	Yes	07-06-1988	--	Regular

20	Dr Radhu S	33	Assistant Professor	Female	Ph.D	13	Yes	Yes	01-01-2018	--	Regular
21	SREEJA G R	38	Assistant Professor	Female	Ph.D	103	Yes	Yes	01-12-2010	--	Regular
22	SEETHA LEKSHMI V	54	Associate Professor	Female	Ph.D	380	Yes	Yes	01-01-1988	--	Regular
23	AMSTRONG SEBASTIAN	54	Associate Professor	Male	Ph.D	360	Yes	Yes	17-10-1989	--	Regular
24	JACOB T M	49	Associate Professor	Male	Ph.D	310	Yes	Yes	16-09-1996	--	Regular
25	ANU JOSSY JOY	35	Assistant Professor	Female	M. Phil	142	Yes	Yes	27-04-2010	--	Regular
26	DEEPA ABRAHAM	34	Assistant Professor	Female	NET	72	Yes	Yes	25-06-2013	--	Regular
27	ABY THOMAS	32	Assistant Professor	Male	NET	60	Yes	No	21-06-2014	06-06-2019	Regular
28	Dr Sr Tessy Joseph	57	Associate Professor	Female	Ph.D	334	Yes	No	06-06-1994	29-03-2019	Regular
29	Sr Emy Tomy	36	Assistant Professor	Female	NET	72	Yes	Yes	25-06-2013	--	Regular
30	SHIJA PAUL	44	Lecturer	Female	MCA	251	Yes	Yes	27-08-2002	--	Regular
31	Sr Biji M P	46	Assistant Professor	Female	Ph.D	130	Yes	Yes	28-11-2008	--	Regular
32	DILMOL VARGHESE	56	Associate Professor	Female	M. Phil	374	Yes	No	03-12-2003	29-03-2019	Regular
33	Sr Lovely Abraham	48	Assistant Professor	Female	NET	88	Yes	Yes	28-03-2012	--	Regular
34	MATHEWS K MANAYANI	30	Assistant Professor	Male	NET	44	Yes	Yes	28-12-2015	--	Regular
35	DEEPA LIZA ALEX	40	Lecturer	Female	MCA	153	Yes	Yes	24-01-2011	--	Regular
36	CHRISTY MATHEWS	29	Assistant Professor	Female	MCA	33	Yes	Yes	28-06-2016	--	Regular
37	SOUMYA T K	35	Lecturer	Female	MBA	97	Yes	Yes	03-09-2012	--	Regular
38	Dr Sinju PV	30	Lecturer	Female	Ph.D	16	Yes	Yes	01-01-2018	--	Regular
39	SUMANMOL VARGHESE	56	Associate Professor	Female	Ph.D	385	Yes	No	02-06-1988	29-03-2019	Regular
40	LISSY JOSEPH	57	Associate Professor	Female	Ph.D	334	Yes	No	06-06-1994	29-03-2019	Regular
41	Dr N SHIBIN MOHANAN	36	Assistant Professor	Male	Ph.D	73	Yes	Yes	25-06-2013	--	Regular
42	P B SANISH	46	Assistant Professor	Male	Ph.D	169	Yes	Yes	31-08-2005	--	Regular
43	VINOD K V	39	Assistant Professor	Male	Ph.D	96	Yes	Yes	18-07-2014	--	Regular

44	MEERA R	36	Assistant Professor	Female	NET	117	Yes	Yes	07-10-2009	--	Regular
45	JASMINE MARY P J	36	Assistant Professor	Female	NET	65	Yes	Yes	14-07-2014	--	Regular
46	SHAIMON JOSEPH	32	Assistant Professor	Male	NET	87	Yes	Yes	28-03-2012	--	Regular
47	Anu J Marattil	37	Lecturer	Female	MSc(Statistics)	124	Yes	Yes	22-06-2009	--	Regular
48	Sherin Mathew G	43	Lecturer	Male	MCA	234	Yes	Yes	01-07-2003	--	Regular
49	SMITHA M	43	Lecturer	Female	MCA	229	Yes	Yes	07-05-2007	--	Regular
50	SAJI JOSEPH	53	Associate Professor	Male	M.Sc.	360	Yes	Yes	01-11-1989	--	Regular
51	SIJI P JOY	38	Lecturer	Female	MCA	158	Yes	Yes	16-08-2006	--	Regular
52	AMBILY ELIZABETH GEORGE	33	Assistant Professor	Female	NET	60	Yes	Yes	14-07-2014	--	Regular
53	ALPHONSA JOSE	30	Assistant Professor	Female	NET	61	Yes	Yes	06-06-2014	--	Regular
54	PREETHY GEORGE	37	Lecturer	Female	M.Sc.	93	Yes	Yes	01-12-2011	--	Regular
55	George James T	52	Associate Professor	Male	Ph.D	306	Yes	Yes	05-06-2017	--	Regular
56	Dr Vishnu Thankappan	29	Lecturer	Male	Ph.D	12	Yes	No	01-01-2018	31-03-2019	Adhoc / Contractual
57	SUJA C	52	Associate Professor	Female	Ph.D	288	Yes	Yes	01-07-1994	--	Regular
58	ANNIE THOMAS	46	Assistant Professor	Female	Ph.D	130	Yes	Yes	05-12-2008	--	Regular
59	RAJU V P	52	Associate Professor	Male	Ph.D	340	Yes	Yes	01-10-1996	--	Regular
60	MATHACHAN PATHIYIL	58	Associate Professor	Male	Ph.D	395	Yes	Yes	03-06-1985	--	Regular
61	JAIBY CYRIAC	40	Assistant Professor	Female	NET	72	Yes	No	25-06-2013	06-06-2019	Regular
62	ALPHONSA K JOY	33	Assistant Professor	Female	NET	84	Yes	Yes	19-06-2012	--	Regular
63	SEEMA JOSEPH	47	Assistant Professor	Female	NET	128	Yes	Yes	11-11-2008	--	Regular
64	FRANCIS MICHAEL	47	Assistant Professor	Male	NET	128	Yes	Yes	28-11-2008	--	Regular
65	Philip Augustine	54	Associate Professor	Male	M.Sc.	300	Yes	Yes	04-11-1988	--	Regular
66	SHERRY O PANICKER	43	Lecturer	Female	M. Phil	223	Yes	Yes	01-09-2003	--	Regular
67	SHINI MATHEW	55	Associate Professor	Female	M.A	370	Yes	Yes	14-09-1988	--	Regular

68	SONI SEBASTIAN T	56	Associate Professor	Male	M.Sc.	406	Yes	No	03-10-1985	31-03-2019	Regular
69	ARUN GEO AUGUSTINE	30	Lecturer	Male	M.A	72	Yes	Yes	31-08-2015	--	Adhoc / Contractual
70	JYOTHISH KOTHANAPPILLIL	39	Assistant Professor	Male	Ph.D	44	Yes	Yes	28-12-2015	--	Regular
71	LIJI GEORGE	38	Assistant Professor	Female	NET	96	Yes	Yes	11-07-2011	--	Regular
72	DARSANA SAJIKUMAR	29	Lecturer	Female	M.COM	62	Yes	Yes	20-06-2014	--	Adhoc / Contractual
73	ANCY JOHN	37	Lecturer	Female	MTTM(Tour & Travel)	64	Yes	Yes	16-09-2014	--	Regular
74	Dr Rajesh Kumar B	39	Assistant Professor	Male	Ph.D	13	Yes	Yes	01-01-2018	--	Regular
75	Leena Mathews	54	Associate Professor	Female	M.A	378	Yes	Yes	01-06-2016	--	Regular
76	NIBU Thomson	36	Assistant Professor	Male	Ph.D	159	Yes	Yes	01-06-2017	--	Regular
77	SONA GEORGE	33	Assistant Professor	Female	M. Phil	60	Yes	Yes	01-06-2018	--	Regular
78	LAKSHMI K BABU	25	Assistant Professor	Female	M. Phil	15	Yes	Yes	21-10-2017	--	Adhoc / Contractual
79	JESTIN K KURIAKOSE	39	Assistant Professor	Male	NET	48	Yes	Yes	14-07-2014	--	Regular
80	NIDHI P RAMESH	30	Assistant Professor	Male	Ph.D	47	No	No	01-06-2018	29-03-2019	Adhoc / Contractual
81	T M Joseph	56	Dean / Principal / Director / Vice Chancellor	Male	Ph.D	310	Yes	No	01-06-2016	29-03-2019	Regular
82	PRINCE SAMUEL JOSEPH	28	Assistant Professor	Male	MSW	71	Yes	Yes	23-08-2013	--	Regular
83	ANISH SANKAR	34	Assistant Professor	Male	Ph.D	41	Yes	Yes	01-06-2016	--	Regular
84	ANJALY JOSE	32	Assistant Professor	Female	M. Phil	100	Yes	Yes	14-01-2019	--	Regular
85	Mercyamma Jacob	56	Associate Professor	Female	M.Sc.	370	Yes	No	04-11-1988	29-03-2019	Regular
86	BIJU PETER	48	Associate Professor	Male	NET	280	Yes	No	08-10-1996	03-06-2019	Regular
87	EMMANUAL A J	50	Associate Professor	Male	NET	277	Yes	Yes	01-07-1996	--	Regular
88	LISSY PAUL	59	Assistant Professor	Female	M.COM	218	Yes	Yes	01-06-2001	--	Regular
89	DIVYA K R	34	Assistant Professor	Female	M.A.(Economics)	108	Yes	Yes	02-03-2009	--	Regular
90	SANTHOSH J	53	Assistant Professor	Male	Ph.D	250	Yes	Yes	18-06-2001	--	Regular

91	ABIN WILSON	36	Assistant Professor	Male	NET	59	Yes	Yes	01-07-2014	--	Regular
92	ANEESH SANKAR P S	34	Lecturer	Male	Ph.D	41	Yes	Yes	10-06-2016	--	Regular
93	Dr Sibi C Varghese	36	Lecturer	Male	Ph.D	100	Yes	Yes	01-01-2018	--	Regular
94	BRINCY CYRIAC	23	Assistant Professor	Female	M.A	20	Yes	Yes	19-07-2018	--	Adhoc / Contractual
95	DEEPTHI THOMAS	36	Assistant Professor	Female	MCA	137	Yes	Yes	05-11-2012	--	Regular
96	ANN MARIA GEORGE	38	Assistant Professor	Female	M.COM	77	Yes	Yes	06-08-2012	--	Regular
97	NINU JOSE	29	Assistant Professor	Female	M.COM	62	Yes	Yes	01-11-2012	--	Regular
98	SWATHYCHITHRA K S	28	Assistant Professor	Female	M.COM	62	Yes	Yes	02-06-2014	--	Regular
99	ANET THOMAS	29	Assistant Professor	Female	MCA	60	Yes	Yes	10-09-2014	--	Regular
100	RAKHY RAJAN	28	Assistant Professor	Female	M.COM	54	Yes	Yes	01-08-2014	--	Regular
101	ANCY JOHN	31	Assistant Professor	Female	MTTM(Tour & Travel)	64	Yes	Yes	16-09-2014	--	Regular
102	JAIMOL J MOOZHIYANIKAL	30	Assistant Professor	Female	MHRM	76	Yes	Yes	22-04-2013	--	Regular
103	CHINCHU LOUIS	28	Lecturer	Female	MBA	50	Yes	Yes	18-07-2015	--	Adhoc / Contractual
104	JULIA AUGUSTINE	34	Lecturer	Female	NET	51	Yes	Yes	01-01-2015	--	Regular
105	SANKAR P D	32	Assistant Professor	Male	MBA	37	Yes	Yes	01-06-2017	--	Adhoc / Contractual
106	LAKSHMI BABU	25	Assistant Professor	Female	M.Sc.	24	Yes	Yes	01-06-2017	--	Adhoc / Contractual
107	POORNA PUSHKALA A	24	Assistant Professor	Female	M.A	24	Yes	Yes	06-06-2018	--	Adhoc / Contractual
108	Anu Mary Joseph	32	Assistant Professor	Female	Ph.D	12	Yes	No	01-01-2018	29-03-2019	Adhoc / Contractual

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YAHOO! MAIL INDIA Classic

Nirmala College - academic audit

7 February, 2015 12:57 PM

From: "Jacob john" <jjkattakayam@yahoo.com>
To: vnedungattu@yahoo.in
1 File (24KB)

Nirmala ...

Dear Rev Fr. Vincent Nedungattu,

If u require any clarifications, pl feel free to call me.
With warm regards and best wishes
John Kattakayam

Jacob John Kattakayam
Professor Emeritus
Dept. of Sociology, University of Kerala
Karyavattom, Trivandrum 695 581, India

(Former Director, UGC Academic Staff College & Dean, Faculty of Social Sciences University of Kerala, Former Member ICSSR, Immediate Past President of Indian Sociological Society, New Delhi)

Mob: +91-9447711122
Email: jjkattakayam@yahoo.com, jjkattakayam1@gamil.com

Resi: K - 37, Kailas Nagar, Pattom
Trivandrum 695004, India
Ph: 0471 - 2448650, 2446592

ACADEMIC / DEPARTMENTAL AUDIT
NIRMALA COLLEGE, MUVATTUPUZHA

MCA	
Strength	➢ 60 students ➢ Online teaching method ➢ Higher percent of students opting for higher studies
Weakness	➢ Lack of permanent faculty ➢ Limited exposure of teachers as seminar presentations
Opportunity	➢ Collection of feed backs from students ➢ Aspiring students for higher studies
Challenges / Suggestions	➢ Having permanent faculty ➢ Maintaining decreasing demand ration for the course ➢ Ensuring placement of students at an average level ➢ Details of refresher / orientation course attended by the faculties may be furnished
BOTANY	
Strength	➢ Participation in science congress ➢ Annual science exhibitions ➢ Maximum exposure to the students through invited lectures and seminars ➢ Furnished details about campus flora, botanical garden and herbal garden ➢ Good success rate and pass percentage
Weakness	➢ Majority of faculty do not have Ph.D ➢ Lack major projects ➢ Publication is done only by a few faculty ➢ No details about diversification of teaching method adopted
Opportunity	➢ Certificate course ➢ Increasing demand for the subject ➢ Feedback from students and parents ➢ Students' progression to higher studies
Challenges / Suggestions	➢ Faculty improvement ➢ Increasing publication of all faculty members ➢ Combating dropout rate ➢ Obtaining major research projects ➢ Collaborative efforts ➢ Details of refresher / orientation course attended by the faculties may be furnished

CHEMISTRY	
Strength	➢ Research center ➢ Tutorial system ➢ Remedial coaching ➢ ICT enabled teaching ➢ Funded research projects
Weakness	➢ Faculty publication ➢ Collaborative research efforts ➢ Lack output of research scholars
Opportunity	➢ Highly qualified faculty ➢ Invited lectures and paper presentations by experts in the field. ➢ Exposure of faculties at international level
Challenges / Suggestions	➢ Maintaining student progression and success ratio ➢ Student placement ➢ Details of refresher / orientation course attended by the faculties may be furnished
COMMERCE	
Strength	➢ Conducting of add-on-courses & certificate programme. ➢ Increasing demand ratio of programmes – B.Com & M.Com. ➢ Tutorial system, remedial coaching
Weakness	➢ A few faculties hold Ph.D
Opportunity	➢ Recognized research centre ➢ Handful number of research scholars ➢ Consultancy services by faculties ➢ Department library
Challenges / Suggestions	➢ Increasing publication of faculty members and research scholars ➢ Publication details of the research scholars in the department is not given ➢ Fund generated by the department through consultancies may be indicated to analyse the level of advantage of the consultancy works. ➢ Details of refresher / orientation course attended by the faculties may be furnished
COMMUNICATIVE ENGLISH	
Strength	➢ Innovative step towards having campus radio ➢ Training in short film & documentary making ➢ Having monthly newsletter
Weakness	➢ Nor projects or collaborative efforts by the department ➢ No faculty member has Ph.D
Opportunity	➢ Campus radio – "campus beat"

	➢ Internship may increase more students to choose this subject
Challenges / Suggestions	➢ Give faculty details on: o paper presentations o book & article publication o seminars organized o as resource person ➢ Report of the department ignore many of the aspects in its profile, pls include atleast vital information. ➢ Details of refresher / orientation course attended by the faculties may be furnished
ECONOMICS	
Strength	➢ All faculties having major/minor projects. ➢ Stable demand ratio of the course ➢ Remedial coaching for slow learners
Weakness	➢ Only one has Ph.D as the highest qualification among the 11 faculties. ➢ Lacking field exposure to students like visiting doing internship industrial units & corporate units.
Opportunity	➢ Research facilities in the department
Challenges / Suggestions	➢ Conducting seminars / workshops regularly ➢ Need to increase in the number of faculty publications ➢ Found no details of the seminars / workshops organized during the last 2 years. ➢ IQAC may be implemented in the department. ➢ Details of refresher / orientation course attended by the faculties may be furnished.
ENGLISH	
Strength	➢ Increasing demand ration of the subject ➢ Remedial coaching ➢ Various students oriented programmes to improve their employability
Weakness	➢ Limited Ph.D among faculty members ➢ Seminar / workshop organisations are less in number ➢ No research guide in the department ➢ No details of the language lab ➢ Absence of minor/major research projects
Opportunity	➢ Number of faculty members
Challenges / Suggestions	➢ More details of the language lab need to be furnished ➢ Teachers may be encouraged to avail research projects & extension activities

MALAYALAM

Strength	➢ Good faculty strength ➢ Feed back system (form students & parents) ➢ Encouragement to students' publication ➢ Research projects by faculty members. ➢ Collaborative efforts
Weakness	➢ Senior faculties have no Ph.D ➢ Teachers may be encouraged to publish & take major projects
Opportunity	➢ Faculty & students' publication ➢ ICT enabled teaching and resources
Challenges / Suggestions	➢ Increasing the pass percentage in PG level ➢ Equip student in competing NET exam. ➢ Maintaining the high placement ratio ➢ Give details of droop out rate ➢ Need to encourage community level extension activities of the students

MATHEMATICS

Strength	➢ Higher students success ratio ➢ Remedial coaching ➢ Feedback mechanism
Weakness	➢ No faculty members possess Ph.D
Opportunity	➢ Alumni association ➢ Consultancy services ➢ Higher placement record
Challenges / Suggestions	➢ Decreasing number of students getting admitted. ➢ Use of advanced teaching aids ➢ Faculties may be encouraged to undertake projects. ➢ Income generated through consultancy services may be furnished

MCA

Strength	➢ Have abundant number of books in the departmental library ➢ International journals – 12 ➢ Seminars organized ➢ Seminars attended by faculties. ➢ Greater contribution by the department to make the campus techno-friendly
Weakness	➢ No faulty member possesses Ph.D ➢ Lack of major / minor research projects
Opportunity	➢ Industrial visits ➢ Consultancy services ➢ Higher success ratio of students

Challenges / Suggestions	➢ Faculty publications need to be increased ➢ Value of money generated through consultancy services may be audited; should be briefed in the report.
PHYSICAL EDUCATION	
Strength	➢ Alumni members as international players ➢ Faculties serve as resource persons, experts etc
Weakness	➢ Absence of women physical education trainer
Opportunity	➢ Avail financial aid from central government for better training. ➢ Hosting & participation in major events ➢ Research aptitude exerted by the faculties.
Challenges / Suggestions	➢ Innovative programme with long term objectives ➢ Diversified importance to different gamnes.
PHYSICS	
Strength	➢ Community extension activities ➢ Approved research guides
Weakness	➢ Having no MSc programme and research centre ➢ Less research projects undertaken
Opportunity	➢ Handful of publications by faculty members. ➢ Extension research & activities. ➢ Good infrastructure & learning resources
Challenges / Suggestions	➢ Faculty research / Ph.D ➢ Introducing am M.Sc programme ➢ M.Sc may be introduced ➢ Publication is limited to a few faculty
HINDI	
Strength	➢ High profile of the faculty members (7 Ph.Ds) ➢ Feedback system ➢ High student success rate both in UG & PG
Weakness	➢ No details about faculty profile
Opportunity	➢ Approved research centres
Challenges / Suggestions	➢ Faculty participation in national seminars ➢ No ongoing research projects by faculties
STATISTICS	
Strength	➢ M.Sc programmes & training in statistical package to students ➢ Seminar & workshop organization by the department ➢ Good number of international publication by faculty members
Weakness	➢ Lack of research projects
Opportunity	➢ Recognized research centre

	➢ Membership in professional bodies ➢ Placements of students
Challenges / Suggestions	➢ Increasing placements ➢ Consultancy and collaborative efforts may be given more emphasis.

ZOOLOGY

Strength	➢ Having both B.Sc & M.Sc programme ➢ Higher intake from rural area & are mostly girls ➢ Tutorial system & special attention to advanced learners
Weakness	➢ No major projects undertaken yet ➢ Limited publications by faculty members
Opportunity	➢ Certificate course ➢ Regular invited talks ➢ Post admission test to know the strength ➢ Feedback from students, alumni & parents
Challenges / Suggestions	➢ Faculty wise research projects should be given ➢ Money generated through consultancy works may be furnished ➢ Teachers may be encouraged to avail projects

PRINCIPAL
NIRMALA COLLEGE
MUVATTUPUZHA

NIRMALA COLLEGE
Date
MUVATTUPUZHA

Report of the Academic Auditing held at Nirmala College Muvattupuzhaon 06 and 10 November 2017 by the Management constitutedcommittee consisting of Rev. Msgr. (Dr.) CherianKanjirakombil (Chairman), Rev. Dr. George Thanathuparambil (Secretary) and Rev. Dr. Gilson John CMI (NAAC Peer Team Member).

GENERAL OBSERVATIONS

The committee is pleased to register its happiness over the strenuous efforts taken by all teachers under the leadership of the IQAC co-ordinator in arranging facts and figures in a meticulous manner. The presentations, with a few exceptions, were superb. Hospitality and general ambience was good. Still, it is better to keep the following points in mind while presenting yourselves before the real NAAC peer team.

1. Remember that the team is always time conscious. The PPT presentation should not exceed seven minutes. The presentation should be arranged in such a way that the strength of the department is communicated to the team in the first minute itself. The slides should be legible, clear and unambiguous with very minimum words. At the end, the team should get an impression that more things are left unsaid.
2. An interactive environment should prevail in the room. The team should get a feel that all teachers are involved in the process in one way or the other.
3. Criterion wise presentation is advisable. Only the strong points in each criterion need to be enumerated. While presenting the points, the thrust areas of the accreditation process should be kept in mind.
4. Avoid reading the slides verbatim. Translate the slides in your own language with very limited words.
5. Avoid negative comments about the situation prevailing in the institution, even if they are factual. You can convert an inadequacy as a proposition.
6. Don’t offer lame excuses for your failures or inadequacies. Instead, convey your determination to improve the situation.
7. Campus- community partnership is a thrust area of NAAC. Therefore, any activity which can claim a linkage with the neighbourhood should not go unnoticed.
8. Grievance redressal mechanism should be put in place at the department level. Keep a record of action taken report on each complaint received.
9. Collaborations with other establishments/ institutions should be given due projection. Keep an account of income generated and the purpose for which the money has been utilised.
10. Every teacher is expected to keep record of activities done in the Personal diary in a serious and systematic manner.

11. Each department is required to make a SWOC (strength, weakness, opportunities, challenges) analysis
12. Avoid spelling mistakes on the slides
13. It is better to conclude the presentation with a future plan.

CRITERIA WISE OBSERVATIONS

I. Curricular Aspects

1. The focus can be on what extra you are giving to the students. Therefore, the add-on programmes, certificate courses, skill training, spoken English/ Hindi classes, value education etc. which are given outside the prescribed University syllabus can be projected. All departments cansay how they are motivating the students to make use of the facilities in the Language Lab, Computer Lab and Library.

II. Teaching, Learning and Evaluation

1. The programme specific outcome and course outcome have to be delineated. A mechanism be put in place to examine the attainment levels in terms of knowledge, skill, attitude, and values of students. In case the attainment level is found to be short of expectation, explain what remedial measures are initiated.
2. Highlight measures like remedial classes, bridge courses and personal counselling imparted to the benefit of disadvantaged learners, with proper documentary evidences.
3. Convince the team that the department has the practice of preparing teaching plan and academic calendar.
4. Establish the facts that the students are accessing e-learning platforms like MOOC, e-Patashala, Google class room etc; with documentary support.
5. Prove that the departments are providing incentives to advanced learners in terms of scholarships, mentoring, career guidance, academic counselling etc. with sufficient evidences.
6. Establish that we are practicing innovative methods like problem based learning, case studies, field trips, group discussions, e-learning, web based assignments etc. in tune with the technological advancements taking place in the larger world.
7. Also, show that we are providing ICT enabled education with the help of multimedia, simulation, power point etc.
8. Convince the team that our pedagogy is more student centric rather than teacher centric. Therefore, we have to project that we have a vibrant student life on the campus full with activities like competitions, debates and programmes.
9. Substantiate that we have an excellent feedback mechanism through which we consult all stake holders like students, parents, alumni, employers and academic peers

on our teaching learning process to improve the quality of our services. Documentary proof is essential.

10. Prove that we have a transparent evaluation system and grievance redressal mechanism to address the complaints of students on the quality of evaluation.
11. Prove that we are arranging so many external academic lectures for the benefit of students. You can list out the prominent scholars who have interacted with your students.
12. Establish that your academic results are far better than the University average for each programme.
13. Substantiate that meritorious students are seeking admission in your department and there is only very limited dropout rate.

III. Research Innovation and Extension

1. All publications of teachers, irrespective of the period of publication, can be displayed; because it adds to the quality of our teachers. But only the publications of 2013-2017 period be included in the SSR or PPt.
2. Published seminar proceedings also can be included.
3. Convince that the college management is giving sufficient incentives and encouragement to research and extension activities, such as financial support to organise seminars and lectures, duty leave for attending seminars, registration fee for seminars/ conferences and promotion to do Ph.D. and Research projects.
4. Financial resources mobilised out of research projects and extension activities should be highlighted.
5. Number of Ph.Ds awarded from research departments should be highlighted.
6. Orientation and training given to students on developing research aptitude like project works, field visits, nature camps, exposure visits to research institutions motivation to attend seminars and workshops also could be highlighted.

IV. Infrastructure and Learning Resources

1. Claim that you have state of the art facilities for ICT enabled education with adequate number of electronic gadgets like computers, LCD Projectors etc and they are optimally used by the student community.
2. The Number of books and journals related to your subject available in the library can be given attention to.
3. The practice of maintaining departmental libraries may be done away with. All books should be kept in the central library, extending access to all teachers and students, irrespective of their subject of study.

4. The physical infrastructure in the class rooms and laboratories like fans, television screens, LCD Projectors, Lab equipment can also be explained.
5. The wi-fi facility, if available, in the Labs and library will add to our credentials.
6. The students should be encouraged to access e-resources like INFLIBNET.

V. Student Support and Progression

1. Prestigious scholarships like INSPIRE, Prathibha, Suvarna Jubilee, Single Girl Child etc. should be highlighted along with other scholarship/ grants awarded.
2. Convince that you have a mechanism to prompt the students to apply for scholarships and grants.
3. Coaching classes for NET/ JRF and competitive examinations, career counselling and placement drives can be highlighted.
4. Efforts to motivate students in activities like NSS, NCC, Debates, Sports and Cultural events can be given due weightage.
5. The number of outgoing students proceeded to higher studies and jobs can be projected.
6. The profile of the prominent alumni will strengthen your argument that the department has a good progression rate.
7. You can take credits for the achievements of your students in NSS, NCC, sports, arts etc, as well.
8. Mechanisms for poor aid, remedial coaching, mentoring, grievance redressal, tutorial, counselling also should be delineated

VI. Governance, Leadership and Management

1. Project that democracy exists in your decision making process at the department level. Details of staff meeting, academic plan, work distribution, time table preparation should be explained.
2. Establish that you are getting sufficient support from the management for your academic and infrastructural development.
3. Annual financial plan and future plan also should be prepared.
4. Alumni contribution in any form is to be projected as a welcome trend.

VII. Best Practices

1. Departmental practices like manuscript magazines, feedback mechanism, online submission of assignments, add on courses, plastic shredding, mushroom farming, NET coaching, charity fund, book banks, maintenance of botanical/ spice/ butterfly gardens can be included.

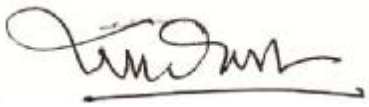
2. The Commerce and Economics departments can keep a notice board outside their staff rooms indicating the currency exchange rates and stock indices with daily updates.
3. The English departments can arrange debates in English, screening of English films, facilities for listening BBC news etc.
4. Peer teaching can be introduced in all departments as a best practice.
5. Computer Science departments can take up computer literacy programmes for the local people in the neighbourhood.

CONCLUSION

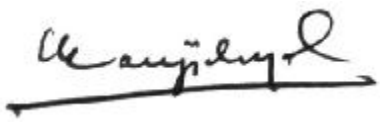
The attempt, in this academic auditing, was just to assess the inherent strength and weaknesses of each department. The team, therefore, gave a patient attention to what is in store for you. Obviously, we did not get time to verify the files/ documents presented before us. We intend to constitute another team for verifying and validating the available data. Probably, we will have another mock visit in the next semester.

We are impressed with the performance of individual departments/ units and the college as a whole. But, still there is room for improvement. We hope, in the days to come, all segments of the college will work united and tirelessly towards the ultimate goal of maintaining desirable standards in the educational services of the institution.

Dr.Gilson John CMI
External Member



Fr. Dr. George Thanathuparambil
Secretary



Mgr. Dr.CherianKanjirakompil
Chairman

NIRMALA COLLEGE

MUVATTUPUZHA, ERNAKULAM (DIST)
KERALA-686 661, INDIA.

(Affiliated to Mahatma Gandhi University, Kottayam and
Re-accredited with CGPA of 2.85 (B Grade) by NAAC)

No:.....

Date 01-10-2018

To

Prof. (Dr.) Suresh Mathew
Professor
School of Chemical Sciences
M.G. University
P.D. Hills P.O, Kottayam – 686 560

Sir,

Greetings from Nirmala College, Muvattupuzha.

Our College is in the process of IV Cycle of accreditation by the NAAC and the peer team is scheduled to visit the college on 30 & 31 October 2018. While the preparations are on high gear, we thought of having an external academic auditing of our institution on 05 & 06 October 2018, so that we can fine tune our arrangements. We are therefore, pleased to constitute an expert committee for the purpose with the following members.

1. Fr.(Dr.) S. Ignacimuthu S.J.
   Former Vice Chancellor of Bharatiyar & Madras Universities
   (Chairperson)
2. Prof. (Dr.) Jacob John Kattakayam
   Former Director
   Academic Staff College, University of Kerala
   Thiruvananthapuram
   (Member)
3. Prof. (Dr.) Suresh Mathew
   Professor
   School of Chemical Sciences, M.G. University
   P.D. Hills P.O, Kottayam – 686 560
   (Member)

As a person who is well experienced in the field of assessment and accreditation activities, your participation in the academic auditing will be of great help to us. You can have a perusal of our Self Study Report (SSR) from our website www.nirmalacollege.ac.in.

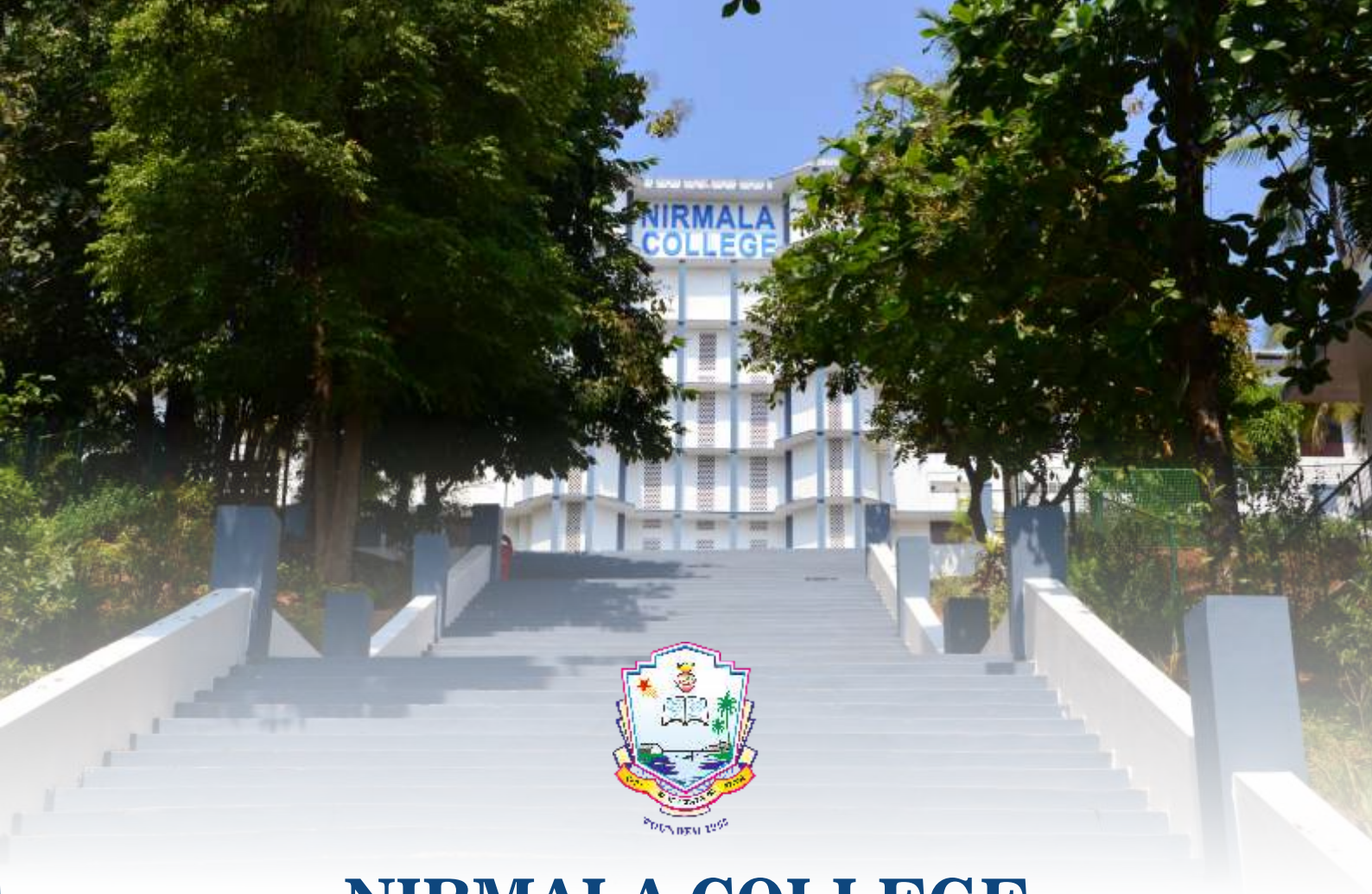
We are pleased to meet your travel expenses and extend local hospitality to the maximum possible extent. We look forward to meeting you on our campus,

Sincerely,

Dr. T.M. Joseph
Principal

NIRMALA COLLEGE 686 661 MUVATTUPUZHA

Ph: 0485 - 2832361 (Office) | 0485 - 2836300 (Principal) | 0485 - 2834689 (Bursar) | Fax: 0485 - 2836300



NIRMALA COLLEGE

MUVATTUPUZHA

ACADEMIC AND ADMINISTRATIVE AUDIT 2018-19

[Dates: October 5 & 6, 2018]

Audit Team

SL. NO	NAME	DESIGNATION
1	Dr.Ignacimuthu S J	Former Vice Chancellor, University of Madras
2	Dr. Suresh Mathew	Professor, School of Chemical Sciences, MG University
3	Dr. Jacob John Kattakayam	Former Director, Academic Staff College, Trivandrum

General Observations

1. Departments have to modify their department profile to include the certificate courses and value added courses offered. The departmental best practices can also be included.
2. In addition to the result analysis of the IQAC, departments have to do in depth course wise result analysis by comparing the results with university averages.
3. The minutes book of some departments do not reflect the activities undertaken by them. Department minutes book should include agenda, resolutions and action taken reports.
4. The activities of the departments should be displayed in the website.
5. A hand book of POs, PSOs and COs shall be prepared department wise.
6. The profiles of faculty should be given in the website.
7. Departmental academic plans should be given on the department notice boards.
8. Departments should prepare a three-year strategic plan.
9. There should be separate file for student progression and placements.
10. The department advisory committee should review the attainment of course outcomes.
11. The syllabus for remedial and bridge courses should be updated.

Significant Achievements

1. Digitalisation of Teaching and Learning Process
2. MHRD approved Institutional Innovation Council
3. Implementation of Green Protocol for the college
4. Swachhta Ranking Team visit 2018 and 2019(Only 3 colleges included from the state)
5. Institutional subscription to Plagiarism software
6. New research centre in English Department.
7. Teachers ventured into e-learning and digital content creation.

I. Curriculum Aspects

a. UGC sponsored B.VocProgramme in Logistic Management started
b. Four new employability focussed certificate courses are introduced.
c. 294 students got enrolled in newly introduced certificate courses. This number can be further increased.
d. The number of job oriented certificate courses shall be increased.
e. There should be more field based inquiry in the curriculum delivery.
f. Though the college offers a value education course to the entire students, proper documentation of the same is not done.
g. The online mechanism adopted for 360^0 feedback is good.
h. More FDPs shall be organised for newly introduced courses.

II. Teaching, Learning and Evaluation

a. The demand ratio for the programmes is very high and it shows the brand equity of the institution.
b. The action taken report of result analysis should be maintained by the departments.
c. The institution has a mentoring and remedial policy in place.

d. The syllabus of remedial teaching should include the basics the subject.
e. The improvements through remedial coaching can be filed by departments.
f. The institution employs new methods of evaluation such as online quiz, book review, etc.
g. PAT should be implemented at UG level also.
h. IQAC should take appropriate steps to improve the pass percentage above 90%.
i. The teachers use MOODLE and Google Classroom platforms for effective teaching.
j. An online question bank is made available to the students.

III. Research, Innovations and Extensions

a. The college received funds amounting to nearly 6 lakhs during the academic year.
b. 14 PhDs have been produced by the research centres.
c. Postgraduate department of English got elevated as research department.
d. 48 new publications in UGC listed journals.
e. Institution subscription to plagiarism software.
f. Students projects should have plagiarism free certificate.
g. The performance of the college on extension activities is outstanding.
h. Better documentation is needed for internship projects and MoUs.
i. The College has been sanctioned a whopping sum of Rs.2 crore under the RashtriyaUchatarShikshaabhiyan (RUSA).
j. The Union Government has selected the college for the Unnat Bharat Abhiyan (UBA), by which the college is entrusted to carry out community services in five neighbouring villages. The grant is to the tune of Rs.50000 for each village per year.

IV. Infrastructure and Learning Resources

a. The administrative office of the college is now shifted to state-of-the art building newly constructed.
b. The campus has now got two beautiful gateways for restricting the trespassers.
c. Extension new block
d. Opened the Mini Theatre on the campus
e. Seminar halls, class rooms, LCD projectors are newly added.
f. New library software KOHA introduced.
g. Digital library facility and e-learning centre added.
h. The class rooms should be 100% ICT supported.
i. There should be provision for lift.
j. There should be Central server facility in the college.
k. 1600 new books and 9 new journals are added to the central library.
l. Bandwidth upgraded to 200 mbps.
m. The college has spent more than Rs. 2 crores for academic and physical facilities during 2018-19.

V. Student Support and Progression

a. 196 students got placement.
b. The college should conduct more in house placement drives.
c. The college should showcase prominent alumni list.
d. Departments should highlight winners in NET/JRF examinations.
e. There should be a register for placement and student progression department wise.
f. There should be a list of e-grant awardees in the department.
g. The NSS unit of Nirmala College is bestowed with Best NSS Unit award for its achievements in 2017-2018.
h. Students should be encouraged to participate in seminars and conferences.
i. The college should increase the student progression to above 40%.

VI. Governance, Leadership and Management

a. Strategic plan for 2019-20 should be prepared in tune with the RAF.
b. The comments made by the students should be brought into the managing board.
c. There should be remedial measures on the feedback on curriculum and institutional performance and the same should be communicated to the students.
d. The participation in peer evaluation shall be increased.
e. The coverage of e-governance shall be enhanced.
f. Computer literacy of the non-teaching staff can be improved.

VII. Institutional Values and Best Practices

a. The college has many best practices. The college has institutionalised Nirmala Hastahm and Digi-Campus initiatives.
b. The college is distinctive in college greenery, oxygen park, swachh campus initiatives, etc.
c. The departmental best practices should be highlighted in their presentations.

Conclusion

Though NAAC has not suggested any criteria for AAA audit, we have taken NAAC criteria in the RAF for this academic auditing. From the rigorous evaluation, we understand that the performance of the college is impressive in all aspects. The areas where the college needs improvement are indicated in the general observations.

SL. NO	NAME	DESIGNATION	SIGNATURE
1	Dr.Ignacimuthu S J	Former Vice Chancellor, University of Madras	
2	Dr. Suresh Mathew	Professor, School of Chemical Sciences, MG University	
3	Dr. Jacob John Kattakayam	Former Director, Academic Staff College, Trivandrum	

NIRMALA COLLEGE
MUVATTUPUZHA

Ranked on the 91st position among the colleges in India
by the NIRF Rankings 2017 and accredited by NAAC with B++ grade

Muvattupuzha P. O., Ernakulam Dist., Kerala - 686 661
Telephones:0485 2832361, 2836300
e-mail:nirmalacollege@gmail.com, Website: www.nirmalacollege.ac.in

INTERNAL QUALITY ASSURANCE CELL
INTERNAL ACADEMIC AUDITING
06 & 10 NOVEMBER 2017

TEAM:
Rev. Msgr. Dr. CHERIAN KANJIRAKOMBIL (CHAIRMAN)
Rev. Dr. GEORGE THANATHUPARAMBIL (SECRETARY)
Rev. Dr. GILSON JOHN (NAAC PEER TEAM MEMBER)

SCHEDULE

Date : 06 November 2017

09.05 a.m.	: The team arrives at NESTT
09.10 a.m.	: The team departs to the College
9.15 a.m.	: Reception
9.20 a.m.	: Interaction with the Principal & IQAC
9.30 a.m.	: Zoology
10.00 a.m.	: Physics
10.30 a.m.	: Economics
11.00 a.m.	: Botany
11.30 a.m.	: English & Communicative English
12.00 noon	: Commerce (Regular)
12.30 p.m.	: Maths (Regular & S.F)
01.00 p.m.	: Lunch
02.00 p.m.	: Chemistry

05-10-17

Dr. T.M. JOSEPH
PRINCIPAL
NIRMALA COLLEGE
MUVATTUPUZHA

NIRMALA COLLEGE ★ 686 661 ★ MUVATTUPUZHA

INTERNAL QUALITY ASSURANCE CELL
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TEAM:
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Rev. Dr. GEORGE THANATHUPARAMBIL (SECRETARY)
Rev. Dr. GILSON JOHN (NAAC PEER TEAM MEMBER)

SCHEDULE

Date : 10 November 2017

10.30 a.m.	: Hindi	
10.55 a.m.	: Yoga Centre	
11.00 a.m.	: Statistics	
11.30 a.m.	: Malayalam	
12.00 p.m.	: Computer Science (BCA & MCA) at MCA Block	
12.20 p.m.	: MCA Library	
12.25 p.m.	: Civil Service Academy	
12.30 p.m.	: Management Studies (MHRM & Tourism)	
12.50 p.m.	: Commerce (S.F)	
01.10 p.m.	: Jeeva Jyothi Hostel	
01.20 p.m.	: Library	
01.25p.m.	: Nirmala Academic & Research Publications (NARP)	
01.30 p.m.	: Health Club	
01.35 p.m.	: Canteen	
01.40 p.m.	: Little Flower Hostel	
01.45 p.m.	: Lunch	
02.15 p.m.	: Office	
02.25 p.m.	: NSS	at Parlour
02.35 p.m.	: NCC	
02.40 p.m.	: Centre for Women Empowerment	
02.45 p.m.	: Placement Cell	
02.50 p.m.	: Phy. Edn.	
03.00 p.m.	: IGNOU	
03.05 p.m.	: Botanical Garden / Mushroom Farm	
03.15 p.m.	: Staff Meeting at Auditorium	
04.30 p.m.	: Tea	

NIRMALA COLLEGE 686 661 MUVATTUPUZHA

31-1-2017

Dr. T.M. JOSEPH
PRINCIPAL
NIRMALA COLLEGE
MUVATTUPUZHA

NIRMALA COLLEGE MUVATTUPUZHA

EXTERNAL ACADEMIC AUDITING

05 & 06 October 2018

SCHEDULE

DAY 01	
Time	**Activity**
09.30- 10.00	**Presentation by the Principal**
09.45-10.30	**Interaction with Heads of Department** (Planning and documentation for curriculum delivery, Cross cutting issues integrated into the Curriculum etc..)
	Visit to Departments, Laboratories & Facilities (Assessment of learning levels of students, student centric methods for enhancing learning experiences, Innovation and creativity in teaching-learning, Reforms, Transparency and Grievance-redressal mechanism in Continuous Internal Evaluation (CIE), Adherence to Academic Calendar for conduct of CIE, Statements & Attainment of POs, PSOs & COs etc…)
10.30- 11.00	Chemistry
11.00- 11.30	Botany
11.30- 12.00	English
12.00-12.30	Commerce
12.30- 01.00	Mathematical Sciences
01.00- 02.00	Lunch
02.00- 02.30	Hindi
02.30- 03.00	Malayalam
03.00-03.30	Computer Science
03.30-04.00	Interaction with Students
04.00-04.30	Library, Canteen, Digital Library, Bank, Playground etc.
04.30-05.00	IQAC
05.00-05.30	Hostel

DAY 02	
09.30-10.00	Economics
10.00-10.30	Physics
10.30-11.00	Zoology
11.30-12.00	Management Studies
12.00-12.15	Jeeva Jyothi Hostel
12.15-12.45	Rainwater Harvesting Unit, Herbal Garden, Botanical Garden, Vermi-compost plant etc.
12.45-01.45	Lunch
01.45-02.45	NSS, NCC, Centre for Women Empowerment, Physical Education, Placement Cell, Yoga Club, Anti Ragging Cell
02.45-03.15	Office
03.15-03.45	Interaction with the Principal
03.45- 04.30	Exit Meeting

TEAM

1. Fr.(Dr.) S. Ignacimuthu S.J.
   Former Vice Chancellor of Bharatiyar & Madras Universities
   (Chairperson)

2. Prof. (Dr.) Jacob John Kattakayam
   Former Director
   Academic Staff College, University of Kerala
   Thiruvananthapuram
   (Member)

3. Prof. (Dr.) Suresh Mathew
   Professor
   School of Chemical Sciences, M.G. University
   P.D. Hills P.O, Kottayam – 686 560
   (Member)

Academic Administrative Audit 06 October 2018

Academic Administrative Audit 06 October 2018

NIRMALA COLLEGE

MUVATTUPUZHA

GENDER AUDIT REPORT 2018-19

PREPARED BY

WOMEN CELL

Gender Audit Report Summary 2018-19

Prepared by

Women Cell

Nirmala College, Muvattupuzha

PREFACE

"Gender equality, equality between men and women…does not mean that women and men have to become the same, but that their rights, responsibilities and opportunities will not depend on whether they were born male or female. Gender equity means fairness of treatment for men and women according to their respective needs. This may include equal treatment or treatment that is different but which is considered equivalent in terms of rights, benefits, obligations, and opportunities." –United Nations Educational, Scientific and Cultural Organization (UNESDOC)

Gender equity means fairness of treatment for women and men, according to their respective needs. This may include equal treatment or treatment that is different, but which is considered equivalent in terms of rights, benefits, obligations, and opportunities.

Gender Equality is a global issue, and discussions on women's emancipation and her rights are at the forefront of many worldwide formal and informal campaigns. As the awareness of gender issues increases, women spontaneously take action against women's oppression and exploitation. Gender awareness allows women to move beyond other conventional gender stereotypes and rigid gender role definitions. The gender audit was conducted to identify ways to make college campus safer for women. The audit process involved choosing the sites to be audited, selecting the participants, orientation to the participants, preparing the checklist and the walk –about, writing down the findings and sharing the results with the principal of the college for implementation of the recommendations.

Dr. Leena Mathews	**Dr. Ani Kurian**	**Ms.Sona George**
HOD, Dept. of English	**HOD, Dept. of Zoology**	**Asst. Professor, Dept. of English**

Nirmala College, Muvattupuzha
Gender Policy

- There shall not be any kind of discrimination on the basis of Gender
- The institution shall provide equal opportunity for all genders
- Freedom for all genders to express of free and fair opinion
- There must be an accessible, active, unbiased and confidential grievance redressal cell
- The institute shall arrange effective measures for the safety and security of all gender

Objectives of Gender Audit

The Gender Audit has the following objectives:

• To find out the areas where gender imbalance exists and the factors behind it

• To establish good gender balance in decision-making processes in all areas of the college activities.

• To Suggest measures for bridging the gender gap.

• To Foster gender equality in all aspects of college community.

• To see the work and capacity for prevention of sexual harassment at the college

Key Steps in Gender Audit

- Planning
- Field work
- Draft Report
- Final Report

Introduction

Nirmala College is one of the best colleges in Kerala since 1953 . It is also recognized as “Star College” by DBT, Govt. of India. Its mission is to provide quality education to all by means of hard work, dedication and devotion. The Gender Audit is an attempt to study whether the college has good gender balance. It tries to see whether college follows government rules, policies and actions formulated for up-gradation of women in society. The Gender Audit tries to access the impact of its current and proposed policies on gender equality.

Gender Audit Team reviewed and analysed the operating environment and context of Nirmala college ,Muvattupuzha. From the analysis, the team understood that the college operating in an environment where everyone has access to a full range of opportunities to achieve the social, psychological and physical benefits that come from participating and leading in sports and physical activity. It does not necessarily mean making the same programs and facilities available to both males and females. Gender equity requires that girls and women be provided with a full range of activity and program choices that meet their needs, interests and experiences. Therefore, some activities may be the same as those offered to boys and men, some may be altered, and some may be altogether different.

The college always concentrates on students qualitative performance along with their overall personality development. Observing the gender equality, the girls are provided with various facilities and special attentions. The NCC unit for girls concentrates in developing their characters and qualities like comradeship, discipline, leadership, secular outlook and spirit of adventure. This unit focuses on outstanding achievements of the girls. The NSS has separate unit of girls. The unit always motivates girls for their social responsibilities. Special study room ,waiting room and parking are provided for the girls. They are also given self-defence trainings driving classes in concession rates. The Karate ,Yoga and Meditation trainings are also organized.They are trained for ornament making,cloth bag making and also mushroom cultivation. The lectures of eminent personalities are held on various topics to develop their personalities. Organizing self defence training with the help of Kerala police.

Workshops are held on “Women and Human Rights” and Women and Laws” to make the girls aware of their rights and responsibilities. Girls are made aware of laws and by-laws by organizing lectures of eminent judges, lawyers etc. Anti-ragging Committee and Internal Complaints Committee are formed in the college. These committees arrange lectures of lawyers, social workers to aware the girls for their privileges and duties. In the field of Cultural

Activities and Sports, girls have achieved grand success. Their participation in Youth Festival and various competitions gives name and fame to both to college and to themselves. In the public societal action the college provides classes for parents on parenting issues and also women and Laws. Girls were actively engaged in all the actions taken by college in flood relief actions such as collection and proper distribution of clothes, medicines and utensils. Helps the *kudumbasree* ladies to sell their organic vegetables.

The analysis of the responses of students with regard to programme planning and design in college and its activities revealed that most student members feel that the gender equity in policies, programmes of the college is adequate.

Data Analysis

Table 1: Gender wise Details of Total Students in the College

S.No.	Year	Total	Male	Female	%M	%F
1	2017-18	2654	978	1676	36.85	63.15
2	2018-19	2733	1093	1640	40	60

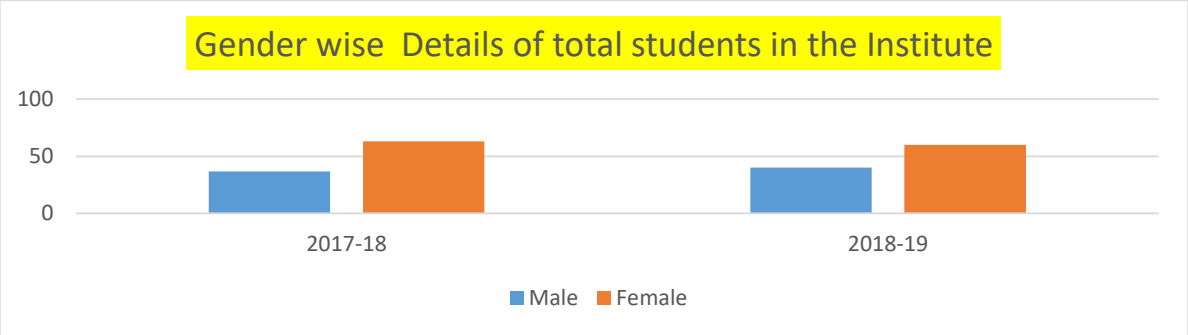


Figure 1: Gender wise Details of Total Students in the College

The table shows year wise gender classification of male and female strength of students and the total number of admissions to the college. It appears that the number of students increased in 2018-19 so there is a slight increase of 3% is found to be there with boy's population as compared to previous year

Table: 2 Gender wise Details of Total Students in Arts Subjects

S.No.	Year	Total	Male	Female	%M	%F
1	2017-18	1068	409	659	38.2	61.7
2	2018-19	1112	464	648	41.7	58.2

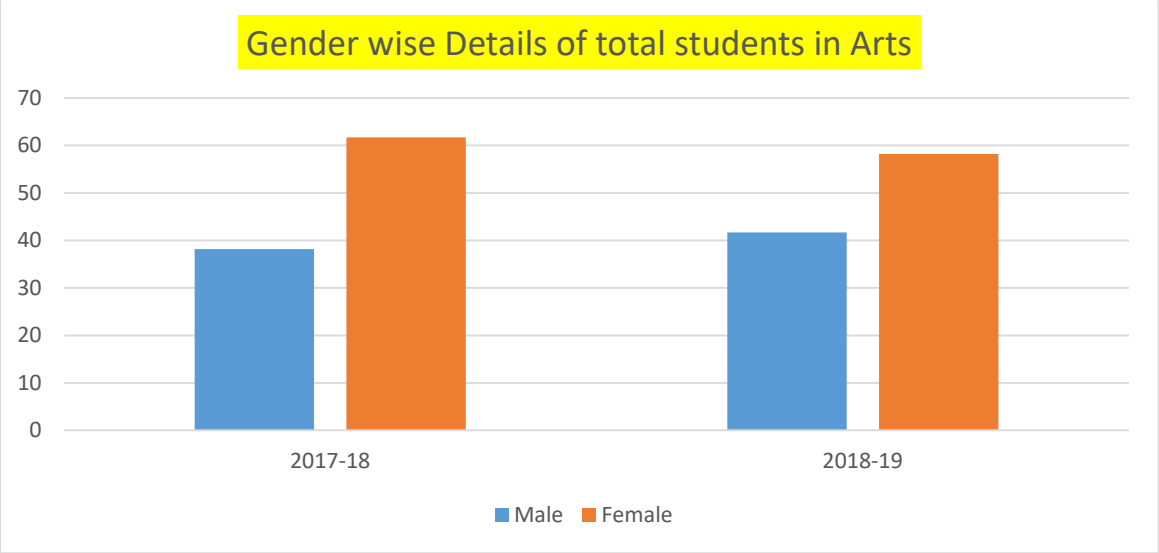


Figure: 2 Gender wise Details of Total Students in Arts Subjects

The 3% increase found in total number of students reflected here also. The number of boys in arts subjects such as Economics, Malayalam, Hindi etc. slightly increased as compared to previous years.

Table: 3 Gender wise Details of total students in Science

S.No.	Year	Total	male	Female	%M	%F
1	2017-18	846	228	618	26.9	73
2	2018-19	867	273	594	31.4	68.5

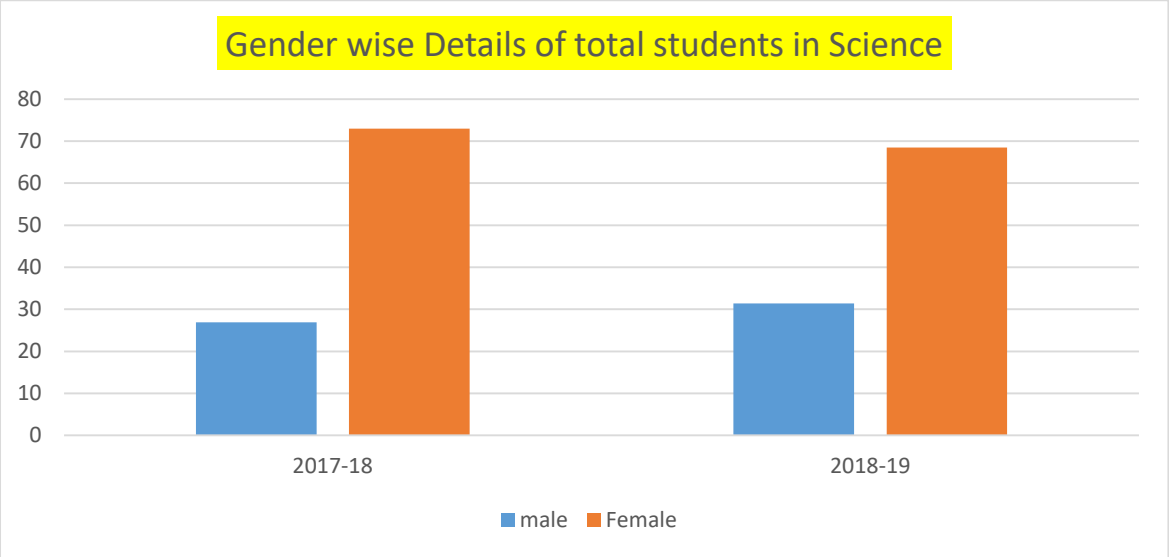


Figure3: Gender wise Details of total students in Science

In science though the number of girls are still more but a decrease is found as compared to previous years.

Table:4 Gender wise Details of total students in commerce

S.No.	Year	Total	male	Female	%M	%F
1	2017-18	659	328	331	49.7	50.2
2	2018-19	668	339	329	50.7	49.2

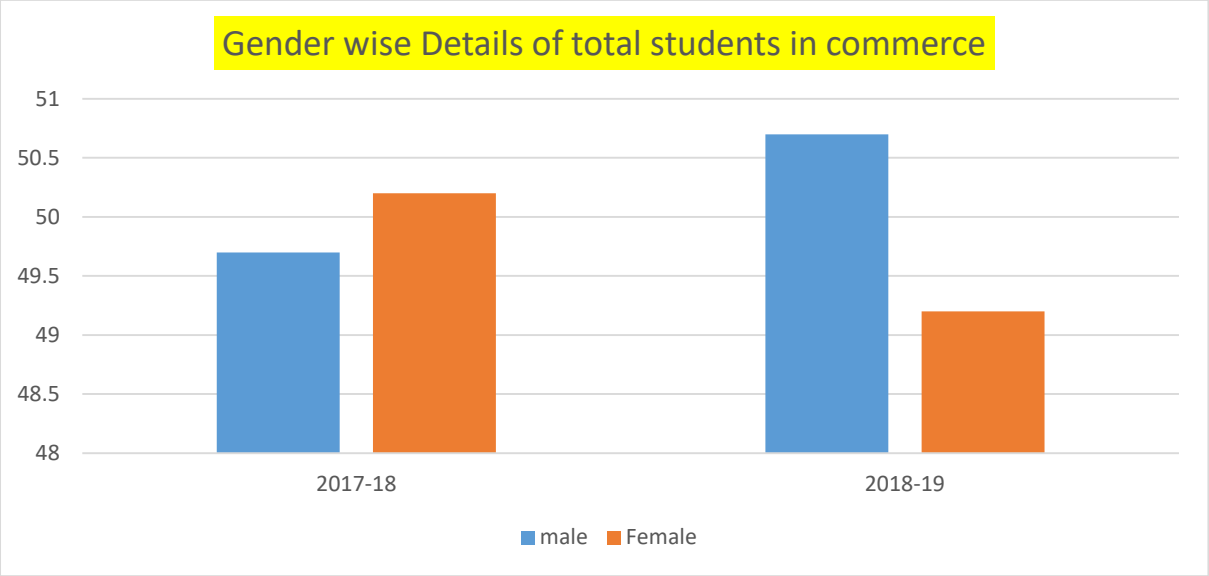


Figure:4 Gender wise Details of total students in commerce

In commerce the total number boys slightly increased. Reduced job opportunity in engineering might be the reason why more boys are turning to arts, science and commerce.

Table:5 Gender wise Details of Teaching staff in College

S.No.	Year	Total	male	Female	%M	%F
1	2017-18	152	58	94	38.1	61.8
2	2018-19	147	53	94	36	63.9

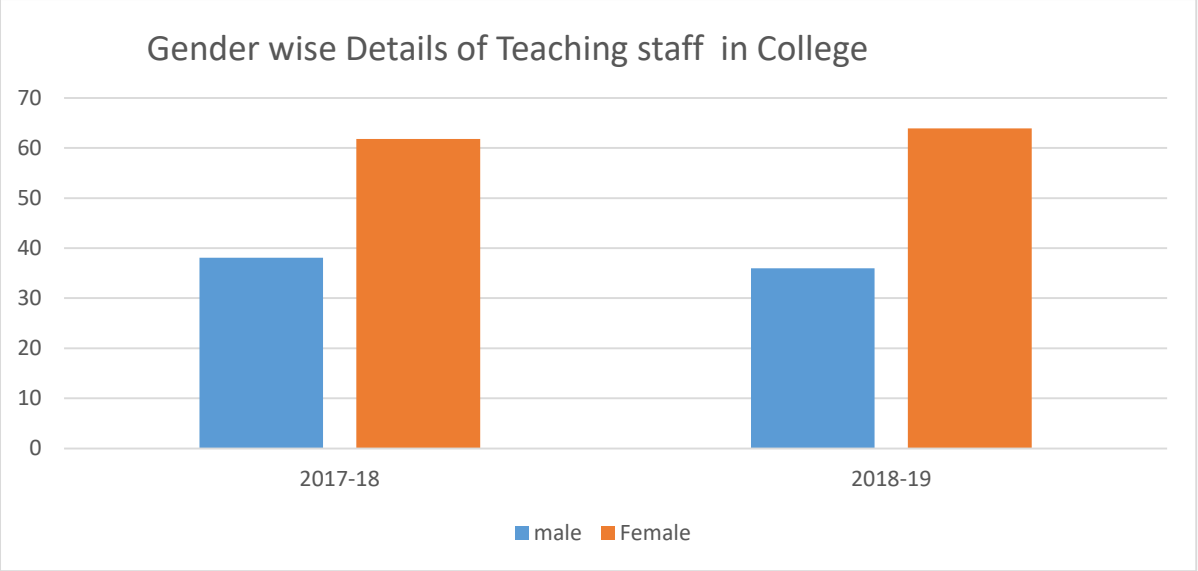


Figure: 5 Gender wise Details of Teaching staff in College

The total number of female teaching staff is more as compares to male. This proves that Kerala women are empowering as time travels. It's also a need of Institution to have more female teachers with more girl students.

Table:* 6 *Gender wise Details of total HODs in College

S.No.	Year	Total	male	Female	%M	%F
1	2017-18	18	10	8	55.5	44.4
2	2018-19	18	10	8	55.5	44.4

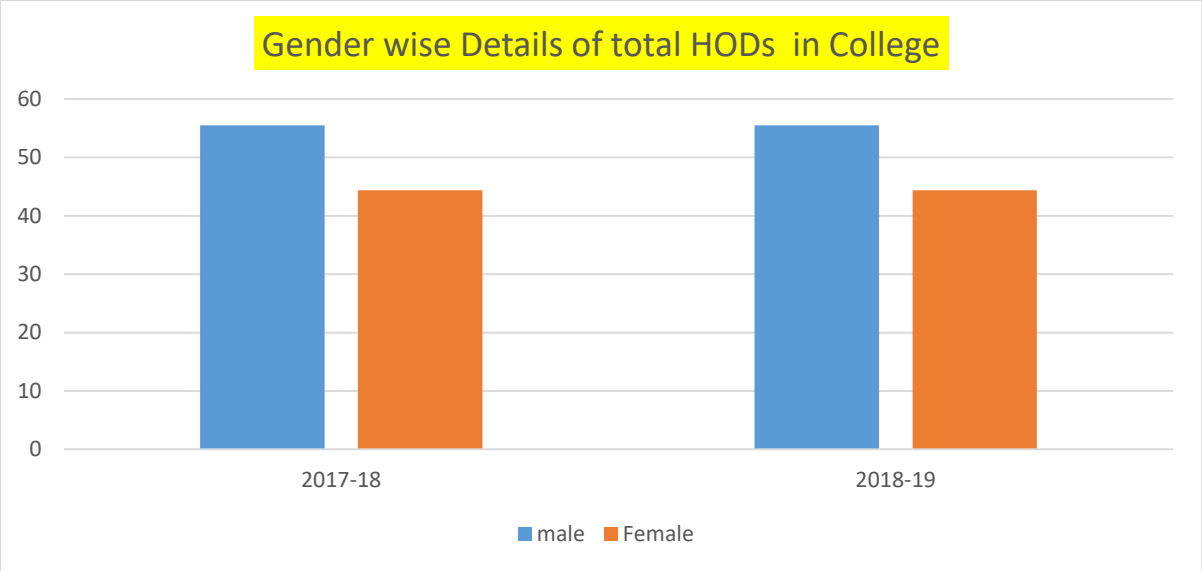


*Figure:*6 *Gender wise Details of total HODs in College*

Since two years the ratio is fixed.

Table:7 Gender wise Details of Non-Teaching staff in College

S.No.	Year	Total	male	Female	%M	%F
1	2017-18	58	29	29	50	50
2	2018-19	58	29	29	50	50

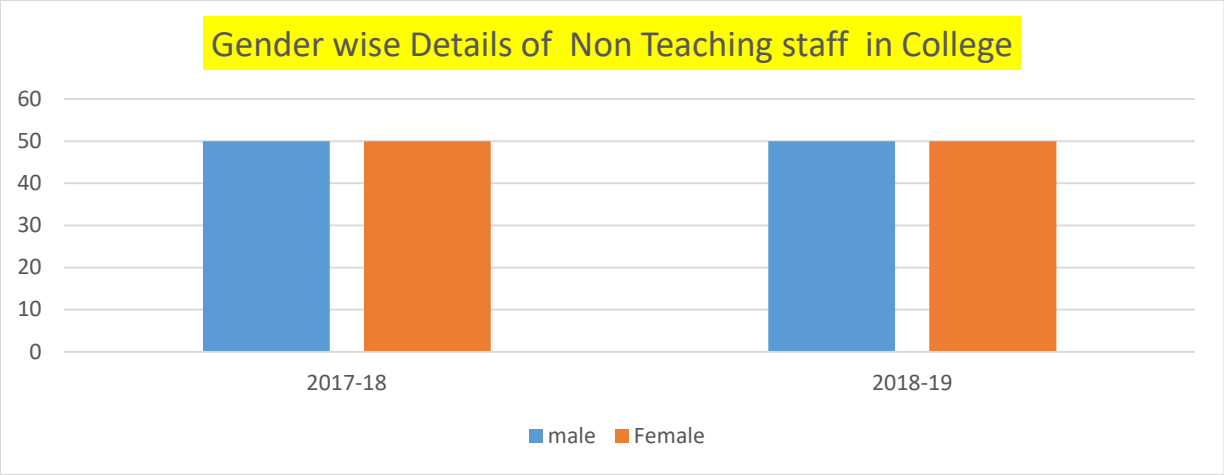


Figure: 7 Gender wise Details of Non-Teaching staff in College

There is a perfect balance between male and female staff.

Table: 8 Gender wise Details of total students in NCC.

S.No.	Year	male	Female
1	2017-18	81	79
2	2018-19	81	79

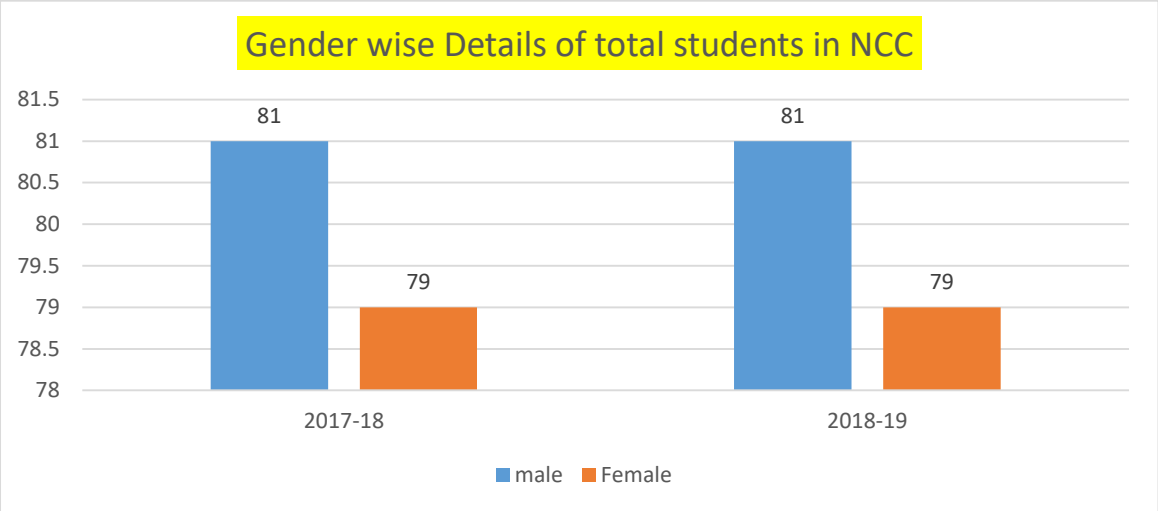


Figure: 8 *Gender wise Details of total students in NCC.*

The number of students in NCC is fixed and it is always full

Table: 9 *Gender wise Details of total students in NSS*

S.No.	Year	male	Female
1	2017-18	33	67
2	2018-19	31	69

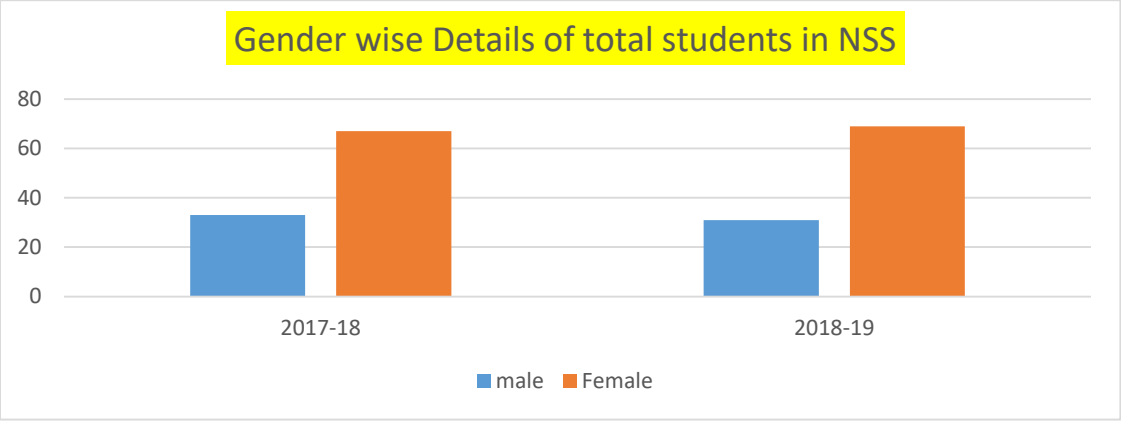


Figure: 9 *Gender wise Details of total students in NSS*

The number of students are fixed at 100 for each year.The degree final year students are exempted .The selection of NSS volunteers are on the basis of their aptitude towards selfless service to societal actions and also the ability to work in group is also considered.Its a matter of pride to see girls always excel in these activities.

Table:10 Gender wise Details of total Participants in College Arts

S.No.	Year	male	Female
1	2017-18	220	673
2	2018-19	211	598

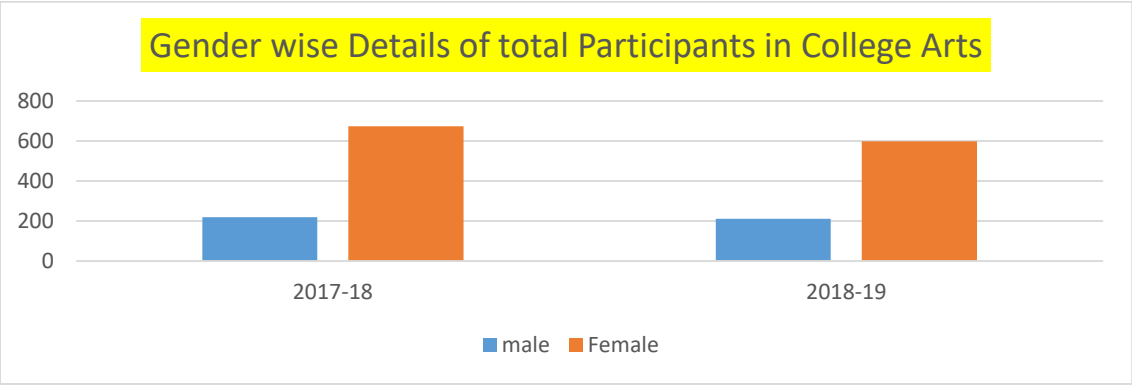


Figure: 10 Gender wise Details of total Participants in College Arts

Girl students always outnumber boys in arts. There are 43 art items conducted for competitions. There are tight competitions for all the items and the best ones out of these represent college in university

Table : 11 Gender wise Details of total Participants in College Sports

S.No.	Year	Male	Female
1	2017-18	320	273
2	2018-19	211	198

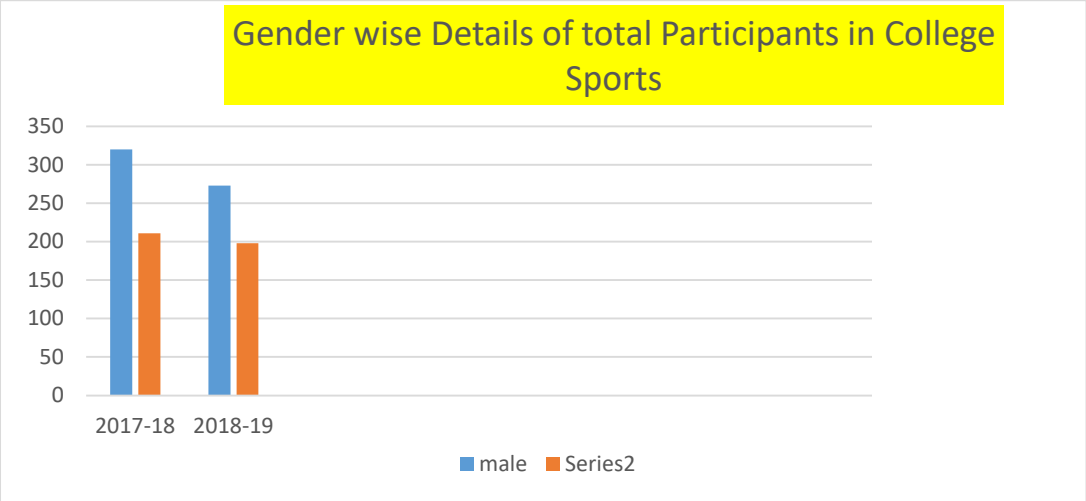
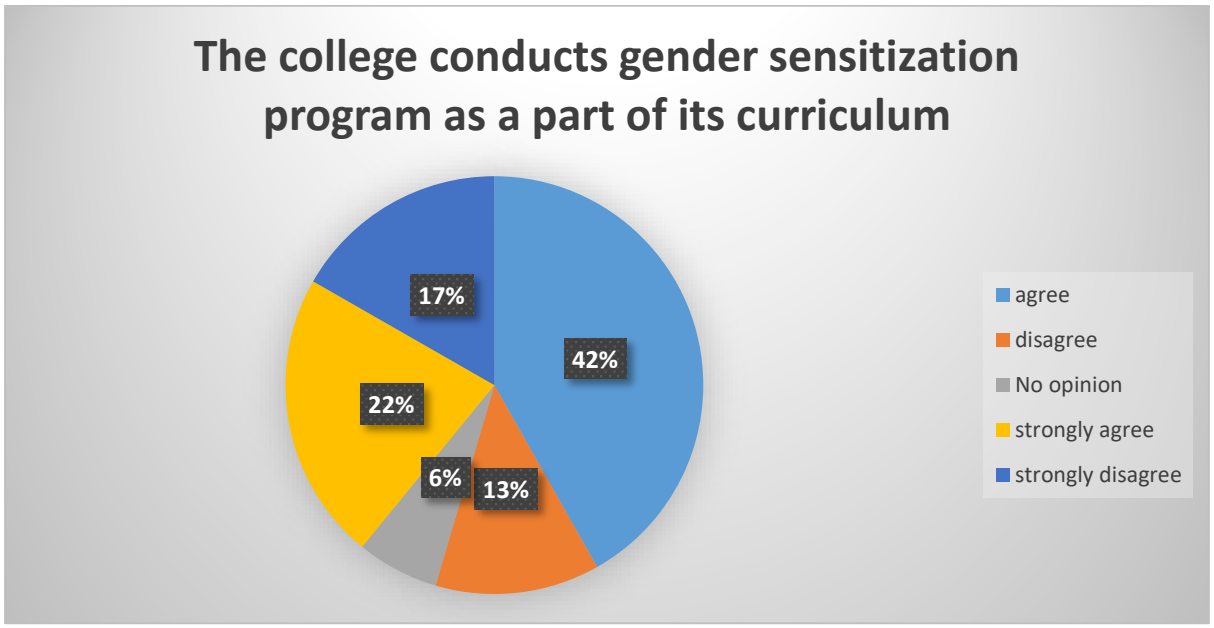
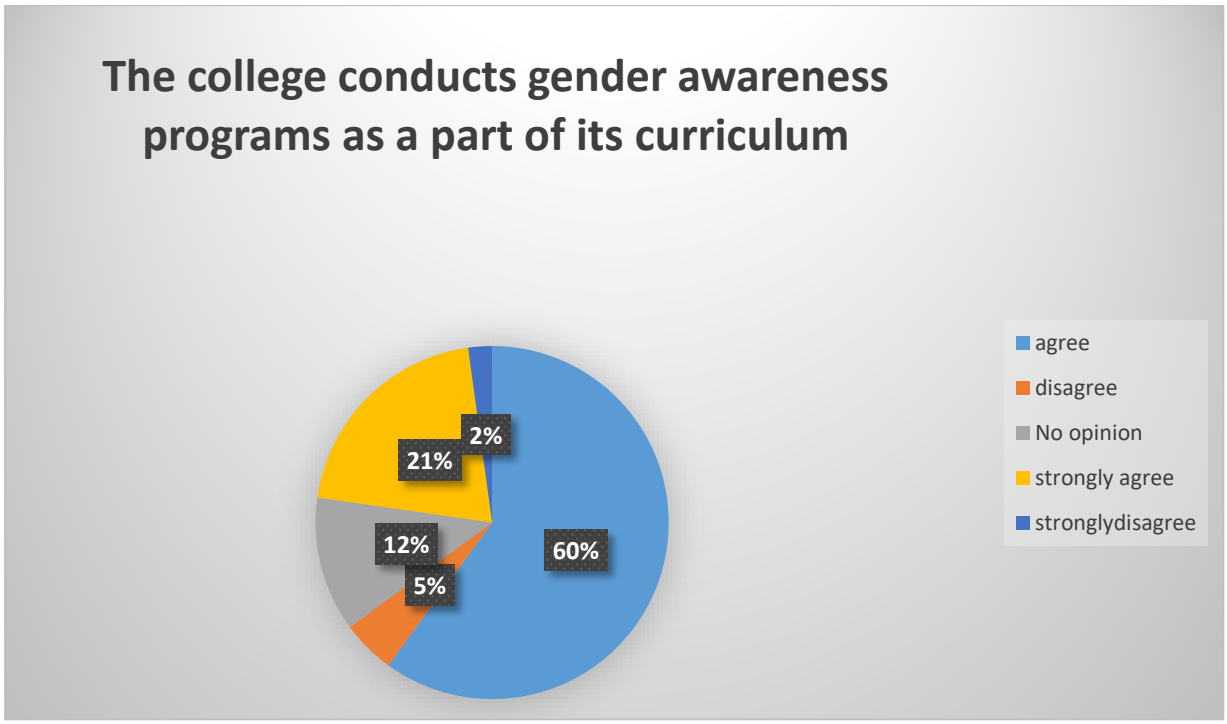


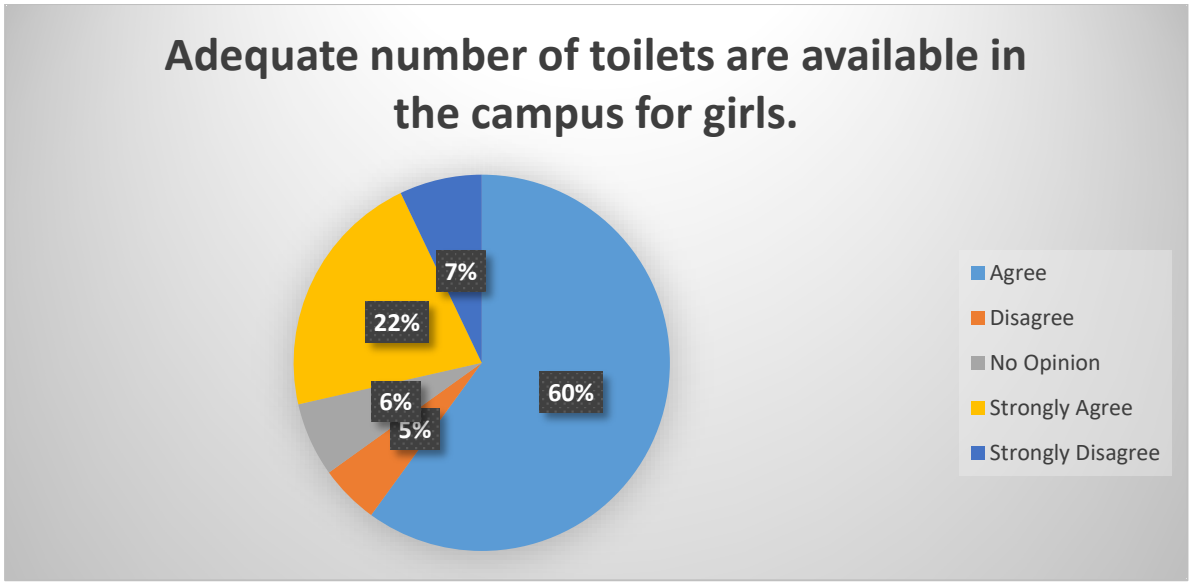
Figure: 11 Gender wise Details of total Participants in College Sports

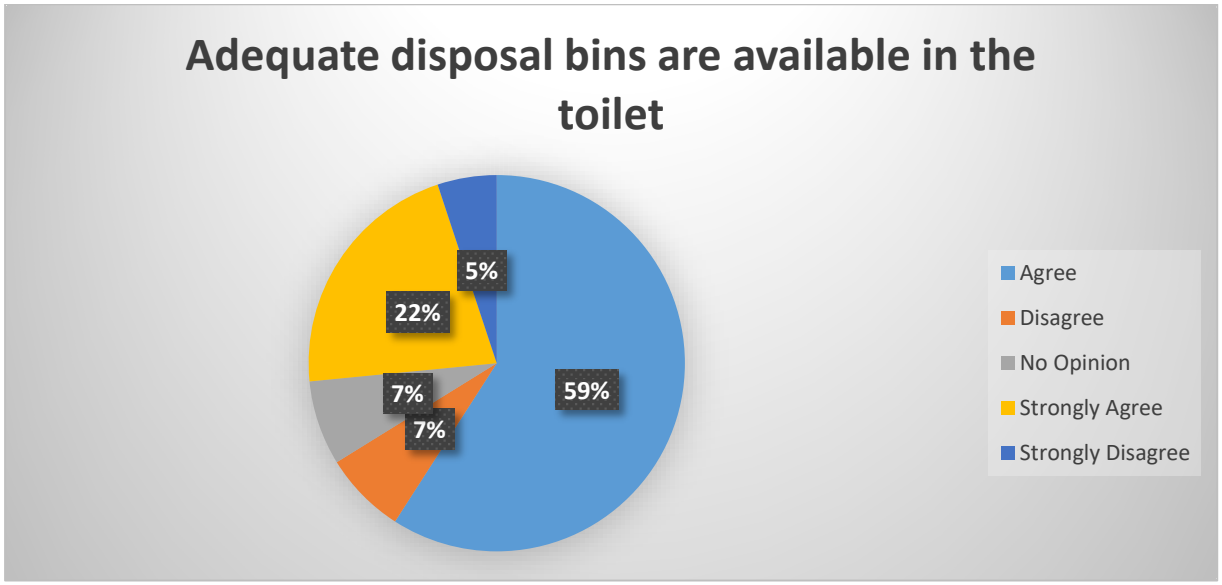
The sports competitions are male dominating. Girls concentrate more on athletics but boys are involved both in athletics and other games too

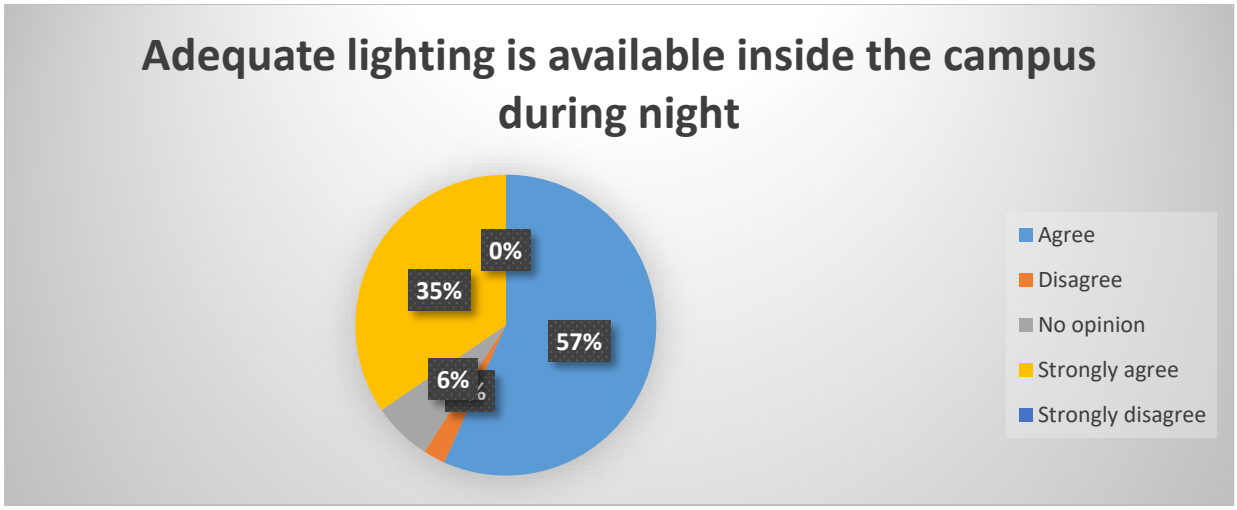
Number of Survey participants-550

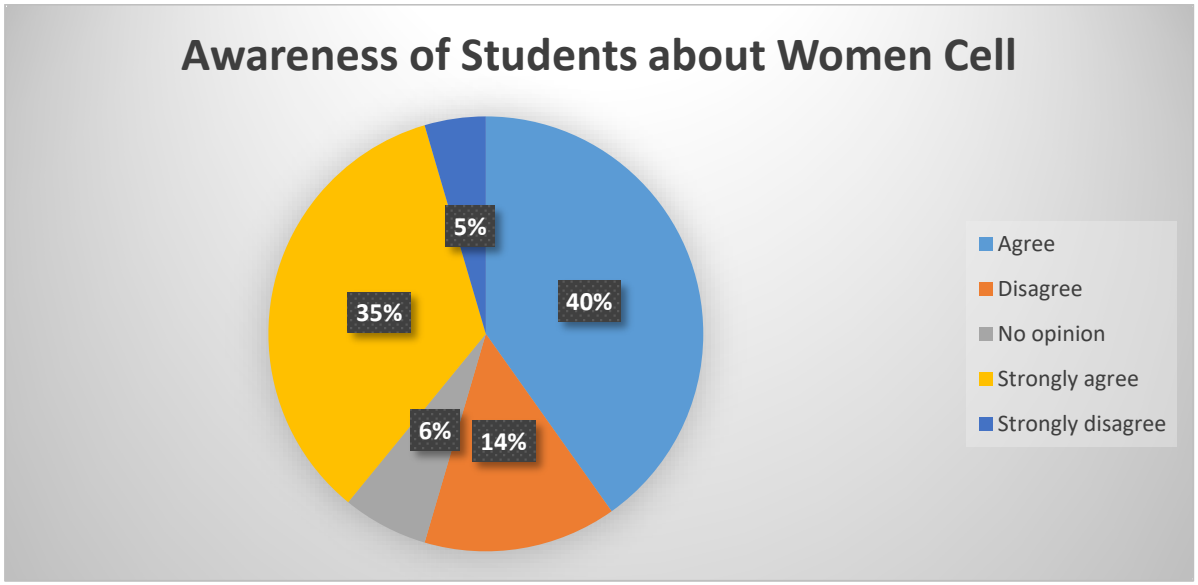


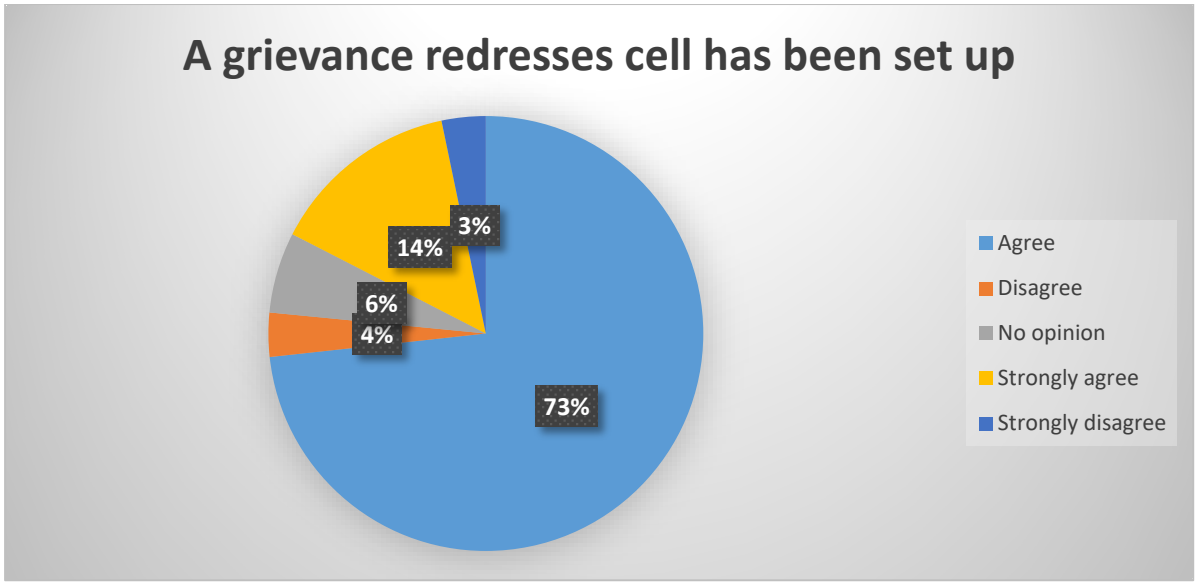


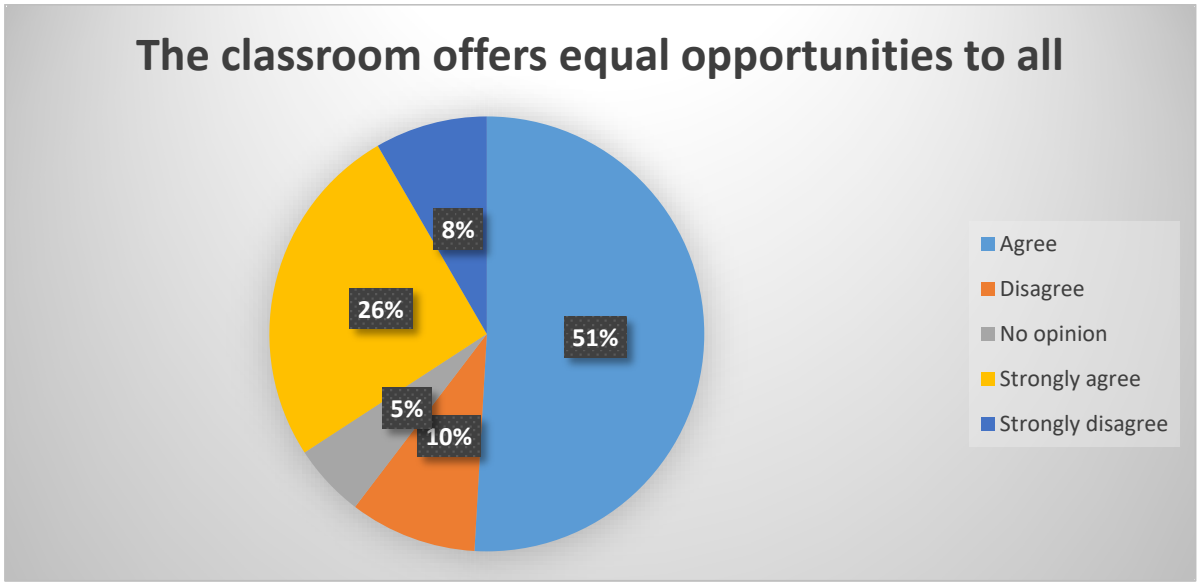

Adequate number of toilets are available in the campus for girls.
7%
22%
6%
5%
60%
Agree
Disagree
No Opinion
Strongly Agree
Strongly Disagree

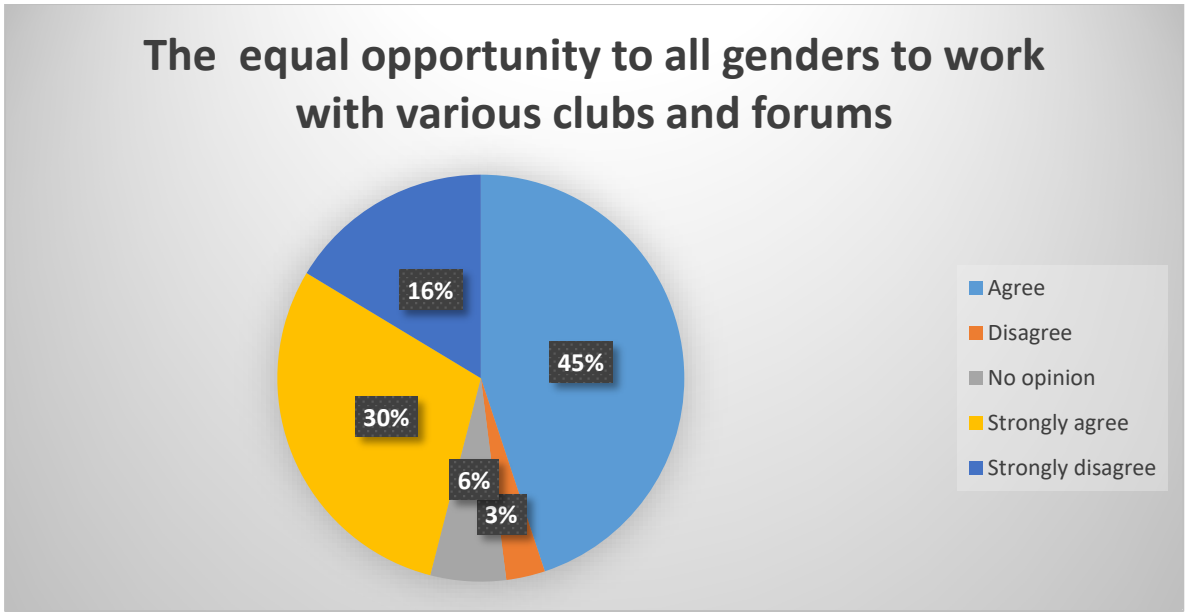

Adequate disposal bins are available in the toilet
5%
22%
7%
7%
59%
Agree
Disagree
No Opinion
Strongly Agree
Strongly Disagree

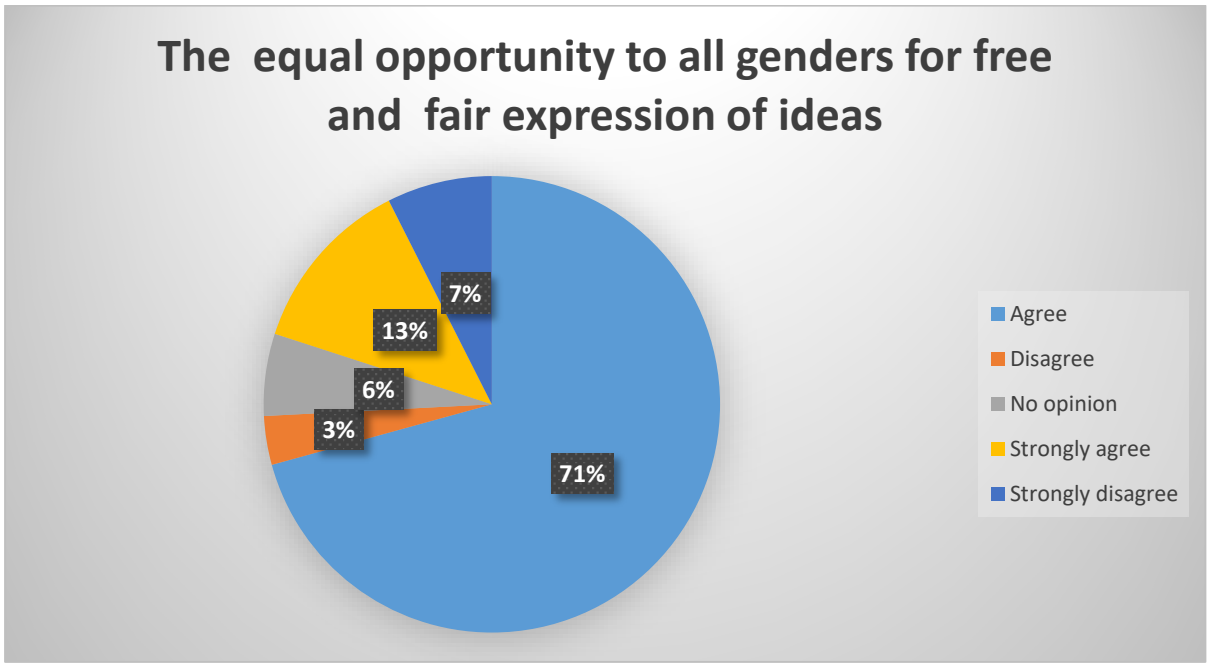

Adequate lighting is available inside the campus during night
0%
35%
57%
6%
Agree
Disagree
No opinion
Strongly agree
Strongly disagree


Awareness of Students about Women Cell
5%
40%
35%
6%
14%
Agree
Disagree
No opinion
Strongly agree
Strongly disagree


A grievance redresses cell has been set up
3%
14%
6%
4%
73%
Agree
Disagree
No opinion
Strongly agree
Strongly disagree


The classroom offers equal opportunities to all
8%
26%
51%
5%
10%
Agree
Disagree
No opinion
Strongly agree
Strongly disagree





Salient Findings

- Students strength particularly girl's strength is high in both arts and science UG and PG programmes
- Girls enrolment is more than that of boys in most of the classes.
- Success rate of girl students is higher than that of boys.
- The participation of girls in cultural activities is higher than boys
- In sports the participation of boys is more than that of girls.
- In regular teaching staff the strength of females are higher than male

- nonteaching staff have an equal male and female ratio.

Suggestions

- Define and deepen the understanding of gender equality concepts such as gender equity, empowerment of women, men and masculinities
- The number of female staff to decision making bodies may be increased
- Organise more sports programmes on a regular basis.
- More awareness program on Legal rights
- College intends to introduce self-employment trainings in different subjects.
- Improve the marketability of the products made by students

Conclusion

The analysis shows that gender equity goals and objective are included in all the policies, programmes of the college and staff also reported that they have no problems related to gender criterion. Gender Audit Team analyzed that the gender equality and gender sensitivity is encouraged by management and staff of the college and they do have gender sensitive behaviour.

It is found that the College has lots of strengths and some weaknesses. The weaknesses can be overcome with gradual changes in value set up. Doubtless, the enrolment of girls from all section of society is increasing and there is no gender issues complaints . With the strong will power and commitment to gender justice, the College would certainly make a mark in the country.

Format of Questionnaire

	Control objective	Option
1	The college conducts gender sensitization program as a part of its curriculum	Strongly agree
		Agree
		No opinion
		Disagree
		Strongly disagree
2	The college conducts gender awareness programs, such as awareness of sexual harassment, as a part of its curriculum.	Strongly agree
		Agree
		No opinion
		Disagree
		Strongly disagree
3	Adequate number of toilets are available in the campus for girls.	Strongly agree
		Agree
		No opinion
		Disagree
		Strongly disagree
4	Adequate facilities are available inside the toilet keeping in mind the need of the girl students. Adequate disposal bins are available in the toilet	Strongly agree
		Agree
		No opinion
		Disagree
		Strongly disagree
5	Adequate lighting is available inside the campus during night, including but not limited to, adequate light in corridor, class rooms, common areas, toilets etc.	Strongly agree
		Agree
		No opinion
		Disagree
		Strongly disagree
6	Adequate security arrangements have been made in the campus and common areas during day and night.	Strongly agree
		Agree
		No opinion
		Disagree
		Strongly disagree
7	Options for flexible timing is available for girl students. For example, for outside scholars, no class is arranged in late evening or early morning.	Strongly agree
		Agree
		no opinion
		Disagree
		Strongly disagree
8	A women cell is set up in the college and students are aware about the women cell.	Strongly agree
		Agree
		No opinion
		Disagree
		Strongly disagree
9	There are lady faculties available in the women cell.	Strongly agree
		Agree
		no opinion
		Disagree

		Strongly disagree
10	Do you reach out to women's cell?	Strongly agree
		Agree
		No opinion
		Disagree
		Strongly disagree
11	A grievance redresses cell has been set up.	Strongly agree
		Agree
		No opinion
		Disagree
		Strongly disagree
12	The classroom offers equal opportunities to all genders.	Strongly agree
		Agree
		No opinion
		Disagree
		Strongly disagree
13	The college offers equal opportunities to all genders on sports	Strongly agree
		Agree
		No opinion
		Disagree
		Strongly disagree
14	There is equal opportunity to all genders to work with various clubs and forums	Strongly agree
		Agree
		No opinion
		Disagree
		Strongly disagree
15	There is equal opportunity to all genders for free and fair expression of ideas	Strongly agree
		Agree
		No opinion
		Disagree
		Strongly disagree

PRINCIPAL
NIRMALA COLLEGE
MUVATTUPUZHA

NIRMALA COLLEGE MUVATTUPUZHA

Green Auditing

Nirmala College, Muvattupuzha

CMJ Eco Associates

Forum for Ecological Analyses

2016-2017

Executive Summary

Green audit is **defined** as an official examination of the effects a college has on the environment. It helps to improve the existing practices with the aim of reducing the adverse effects of these on the environment concerned. Several institutions have applied various view points to preserve the environment within the campus such as promotion of energy savings, recycling of waste, water use reduction, water harvesting etc. Green audit visualizes the documentation of all such activities taking stock of the infrastructure of the college, their academic and managerial policies and future plans. A green auditor will study an organisation's environmental effects in a systematic and documented manner and will produce an environmental audit report. A clean and healthy environment aids effective learning and provides a conducive learning environment.

Green audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste which can be used for a recycling project or to improve waste minimization plan. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and

students better understanding of green impact on campus. Green auditing promotes financial savings through reduction of resource use. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more relevant.

In Nirmala College, Muvattupuzha the audit process involved initial interviews with management to clarify policies, activities, records and the co-operation of staff and students in the implementation of mitigation measures. Staff and students were given training how to collect the data for the green audit process. This was followed by staff and student interviews, collection of data through the questionnaire based survey, review of records, observation of practices and observable outcomes. In addition, the approach ensured that the management and staff are active participants in the green auditing process in the college.

The baseline data prepared for the Nirmala College, Muvattupuzha will be a useful tool for campus greening, resource management, planning of future projects, and a document for implementation of sustainable development of the college. Existing data will allow

the college to compare its programs and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects. The green audit reports assist in the process of attaining an eco friendly approach to the sustainable development of the college. Hope that the results presented in the green auditing report will serve as a guide for educating the college community on the existing environment related practices and resource usage at the college as well as spawn new activities and innovative practices. We expect that the management will be committed to implement the green audit recommendations.

We are happy to submit this green audit report to the authorities of Nirmala College, Muvattupuzha.

Dr. C.M. Joy
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22nd May, 2017

CONTENTS

Chapter 1

Introduction

Nirmala College, Muvattupuzha established in 1953 and is now 64 years old. The college is a centre of higher learning in Ernakulam district with 16 undergraduate programs, 14 post-graduate programs, six research programs, and certificate & diploma programs. The college has played a pivotal role in the socio-economic development of the high ranges and the suburban areas of Muvattupuzha town. The forefathers of the college had envisioned the delivery of quality education wedded with spiritual values to the emerging young population of the region.

The college has 74 regular faculty members in various disciplines of whom 32 are Ph.D. holders. In addition the college has 68 teachers on ad-hoc basis. About 56% of the faculties are women. The total number of non-teaching staff comes to 52. The college has a total student strength of 2710 of which 64% are girls. Though the college is aided by the state government it also receives occasional funding from University Grants Commission (UGC), Department of Science and Technology (DST), Department of Bio-technology (DBT) and Kerala State Council for Science, Technology and Environment (KSCSTE). All

Science departments are DST-FIST supported. The Department of Bio-technology, Govt. of India has accorded the 'Star College' status to the college for three years (2017-2020). Under the scheme, the departments of Botany, Chemistry, Physics and Zoology get a one-time grant of Rs.5 lakh each and annual recurring grant of Rs.2 lakh each for three years. Several major and minor research projects are being carried out by the faculty. Some of the teachers have publications in accredited national and international journals with a high degree of impact factor and h-index. The college regularly undertakes consultancy works for the Rubber Board and the Coconut Board.

The College has a web-enabled Digital Library with over 65000 titles in various disciplines. The college is linked with the UGC sponsored INFLIBNET, enabling on-line access to over 2500 national and international research journals. The college is regularly publishing a bi-annual journal called "Science and Society" with ISSN number from 2003 onwards. The college regularly conducts 13 memorial or endowment lectures on an annual basis. It also organizes five inter-disciplinary national seminars and over 20 invited talks by experts every year, on an average.

The college is credited with the running of a Civil Service Academy on its campus. It provides effective coaching to the civil service aspirants on a regular basis. The integral development of student personality is taken care of by various clubs and units like National Service Scheme, National Cadet Corps, Debating Club, Quiz Club, Catholic Students Movement, Entrepreneurship Development Club, Human Rights Club, Anti-Narcotic Club, Road Safety Club etc.

The students have been consistently contributing to the ethos of the college through their outstanding performance in the University Youth Festivals,

Sports, Games and intellectual pursuits. They maintain high standards in University examinations with occasional ranks and distinctions.

The college gives due importance to the wholesome development of the human personality. In this perspective, we have facilities for computer training, yoga practicing, body building and spiritual renewal. The practice of reaching out to the entire college community through the public address system and educating on topics of common interest on a daily basis for five minutes through the programmes of 'Zero Hour' and 'Nirmala Radio' is a great opportunity for students to learn something beyond their prescribed syllabus. The recreational facilities like department day celebrations, inter-departmental competitions, Onam and Christmas celebrations and Food festival are the means of unearthing the best talents hidden in each student.

In addition, the college offers special training to advanced learners through the platforms of Walk With the Scholar and 'Nirmala Stars'. At the same time, the interests of slow learners are taken care of by the programmes like Scholar Support programme, Remedial Coaching, Peer teaching and Additional Skill Acquisition programme. UGC-NET coaching facility is given to the post-graduate students. The career guidance and placement cell is very active and has been successful in securing maximum campus placements for our students. The Parent Teacher Association and Alumni Association are also very active with many innovative programmes.

On infra-structural front, the college has state of the art facilities. It has five air conditioned conference halls, four auditoriums, six seminar halls, five computer labs, three smart class rooms, one language lab, nearly 250 computers with peripherals, six photocopying machines, 22 DLP Projectors and so on. Two Ladies' Hostels, Boys Hostel, Sports Hostel, Cafeteria, Post-office, Bank, Two ATM Counters, Kiosks, Staff Co-operative Society, Electronic workshop,

Gymnasium, Yoga Centre, Chapel, Counseling Centre, Book Stall and Stationery Shop are other facilities on the campus.

The college administration is assisted and advised by the Governing Body, IQAC, College Council, PTA, Alumni Association, and the College Union in its march ahead.

The emerging system of higher education demands increased importance to skill development in order to make our students more employable by acquiring necessary analytical and soft skills. Aptitude tests, group discussions, interviews, personality tests etc. have become essential components of any education system. Hence, students are encouraged to join clubs/associations for co-curricular activities and take maximum advantage of the facilities available. Let us develop a new culture of innovation and hard work with a firm desire and determination for achieving our goals. We have to be punctual and systematic, humble, sincere and honest. Let us nurture deep rooted values and faith in God along with an uncompromising search for truth, knowledge and excellence in all our endeavours.

The college community is preparing itself for the fourth cycle of accreditation by the NAAC. The IQAC of the college is in the field, grooming the ground for the next cycle of accreditation ever since the third accreditation of the college in 2013. Its focus is on ushering in a positive and qualitative change in the delivery of academic services in the college. The qualitative changes seen on the campus now are the result of concerted and dedicated efforts of the management, staff and students of this institution.

1.1 VISION AND MISSION

Institutional Vision

Academic excellence with integrity of character

Mission

Our mission is the integral development of personality based on Christian ideals. Though instituted primarily to satisfy the educational needs of the Christian community, its portals are ever open to all and it strives to cater to the needs of everyone, irrespective of caste and creed.

1.2 Objectives of the College

Nirmala College is committed to accomplish the following aims:

- Enable students to pursue knowledge with an insatiable thirst, discipline them to harness their energy for creative purposes, make them physically and mentally fit and competent for a career and equip them to be self supportive in life.
- Foster feelings of love, compassion and tolerance towards all and enable them to fight against all social evils. Encourage healthy interaction so that they place the common good of a larger community above their personal interests.
- Induce patriotic fervor and an unflinching pride in the national heritage and inculcate qualities of enlightened leadership, so that they become responsible citizens and good leaders of tomorrow.
- Encourage art, music, dramatics and other forms of creativity inherent in students, make them honour the dignity of labour and encourage service activities and extension programmes.
- Promote healthy staff student relationship and instill in them love and respect towards their parents, elders, people of authority and everyone worthy of respect. To sum up, the College looks forward to educate citizens who love God and serve humanity. The institution endeavours to help the youth to grow up competent, responsible and mature individuals with strength of character, moral uprightness and courage of conviction, imbued with qualities of the head and the heart.

1.3 Total Campus Area & College Building Spread Area

Campus area	**214483.05 M^2**
Built up area	**31164.89 M^2**

List of Places from Where Students Commute

Thodupuzha, Muvattupuzha, Pandappilly, Arakuzha, perumbavoor, kuravilangadu, Ernakulam, Kattapana, Kozhikode, angamaly, kalady, Malapuram, Moolamattom etc.

NAAC Grading in Assessments

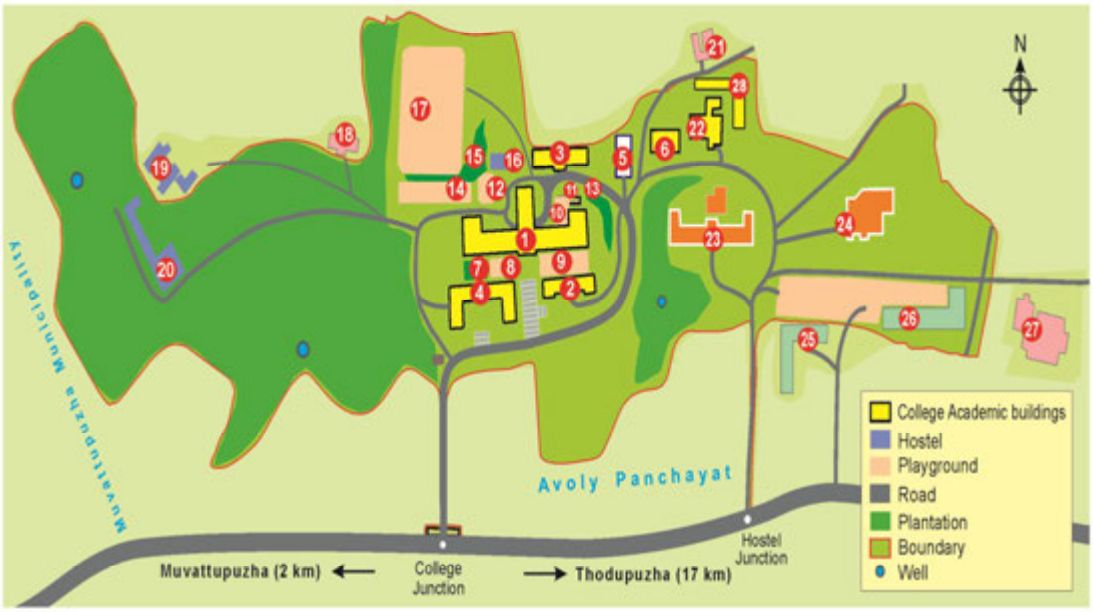
Sl. No.	Cycle	Grade	CGPA	Year of Accreditation	Validity Period
1	1st Cycle		3*	1999	7th Feb 2007
2	2nd Cycle	B++	82.7	2007	31st Mar 2012
3	3rd Cycle	B	2.85	2013	22nd March 2018

1.4 Campus Infrastructure

- Main Block
- P.G Block
- Diamond Jubilee Block
- MCA Block
- Golden Jubilee Block
- New Block
- Utility block
- Alphonsa Hostel

- St Joseph Hostel
- Assisi Hostel
- Little flower Hostel
- Jeevajyothi boy's hostel
- Auditoriums
- Sports wing
- Outdoor stadium
- Canteen
- Audio Visual Hall
- IGNOU
- Kiosk
- CSM
- Language lab
- Placement Cell
- Rest rooms
- Digital Library
- Seminar halls
- Gym
- Research labs
- Computer labs
- Multipurpose synthetic courts
- Basketball court
- Football court

NIRMALA COLLEGE MUVATTUPUZHA
CAMPUS LAYOUT



1. Nirmala College main block
2. Silver Jubilee Memorial PG block
3. Golden Jubilee Memorial Library & Research Centre
4. Nirmala College of Pharmacy
5. Nirmala Matha Church
6. MCA Block
7. Botanical Garden
8. Tennis Court
9. Open air Auditorium
10. Basketball Court
11. Utility block
12. Volleyball Court
13. Herbal Garden
14. Handball Court
15. Salim Ali Park
16. Sports Hostel
17. Football Stadium
18. Assissi Bhavan– Study House
19. St. Joseph's Ladies' Hostel
20. Little Flower Ladies' Hostel
21. Amala Bhavan – Study House
22. Nirmala Institute of Competitive Study
23. Jeevajyothi Gents Hostel
24. Nirmala Centre for Educational, Spiritual and Theological Training (NESTT)
25. Nirmala Junior Public School
26. Nirmala Public & Sr. Sec. School
27. Nirmala-Sp. B.Ed., M.Ed College
28. Diamond Jubilee Block
29. Spice Garden

Chapter 2

Pre-Audit Stage

The green audit practically involves energy conservation, use of renewable resources, rain water harvesting, efforts of carbon sequestration methods, planting trees, waste management including hazardous and e-waste. This requires data collection and efforts for clarification of environmental policies. Green auditing includes systematic identification, recording and analysis of components related to sustainable development of an educational institution to preserve for future generations. The process has three important stages such as pre audit stage, audit stage and post audit stage.

In Nirmala college, Muvattupuzha a training programme was conducted for students and staff to help them collect data during the audit processes. Pre-audit meeting held in the college also provided an opportunity to reinforce the scope and objectives of the audit, and discussions were held on the practicalities associated with the audit. This meeting is an important prerequisite for the green audit as it is the first opportunity to meet the auditee and deal with any concerns. It was held at Nirmala College, Muvattupuzha on 29th November,

2016. The meeting was an opportunity to gather information that the audit team can study before arriving at the site. The audit protocol and audit plan was handed over at this meeting and discussed in advance of the audit itself.

In Nirmala College, Muvattupuzha pre-audit meeting was conducted successfully and necessary documents were collected directly from the college before the initiation of the audit processes. Actual planning of audit processes were discussed in the pre-audit meeting. Audit team was also selected in this meeting with the help of staff and the college management. The audit team worked together under the leadership of the lead auditor to ensure completion within the brief period and scope of the audit.

2.1 Management's Commitment

The Management of the college has shown the commitment towards the green auditing during the pre-audit meeting. They were ready to encourage all green activities. It was decided to promote all activities that are environment friendly such as awareness programs on environment, campus farming, planting more trees in the campus etc. after the green auditing. The management of the college was willing to formulate policies based on green auditing report.

2.2 Scope and Goals of Green Auditing

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Green Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of each individual who are the part of economical, financial, social and environmental processes. It is necessary to

conduct green audit in college campus because students become aware of the green audit, its advantages to save the planet and they become good citizen of our country. Thus Green audit becomes necessary at the college level.

A very simple indigenized system has been devised to monitor the environmental performance of Nirmala College, Muvattupuzha . It comes with a series of questions to be answered on a regular basis. This innovative scheme is user friendly and totally voluntary. The aim of this is to help the institution to set environmental examples for the community, and to educate the young learners.

2 .3 Benefits of the Green Auditing

- ✓ Empower the organizations to frame a better environmental performance
- ✓ More efficient resource management
- ✓ Benchmarking for environmental protection initiatives
- ✓ To provide basis for improved sustainability
- ✓ To create a green campus
- ✓ To enable waste management through reduction of waste generation, solid- waste and water recycling
- ✓ To create plastic free campus and evolve health consciousness among the stakeholders
- ✓ Recognize the cost saving methods through waste minimizing and managing
- ✓ Point out the prevailing and forthcoming complications
- ✓ Authenticate conformity with the implemented laws
- ✓ Enhance the alertness for environmental guidelines and duties
- ✓ Impart environmental education through systematic environmental management approach and improving environmental standards

- ✓ Financial savings through a reduction in resource use
- ✓ Development of ownership, personal and social responsibility for the College and its environment
- ✓ Enhancement of college profile
- ✓ Developing an environmental ethic and value systems in youngsters.
- ✓ Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the college.

2.4 Target Areas of Green Auditing

Green audit forms part of a resource management process. Although they are individual events, the real value of green audits is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Eco-campus concept mainly focuses on the efficient use of energy and water; minimize waste generation or pollution and also economic efficiency. All these indicators are assessed in process of "Green Auditing of educational institute". Eco-campus focuses on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute's energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, green campus and carbon footprint.

- **Auditing for Water Management**

Water auditing is a method of quantifying water flows and quality in simple or complex systems, with a view to reducing water usage and often saving money on otherwise unnecessary water use. Water is life; virtually everything we do or

use each day involves water. Yet, we do not give it the importance that is due to it. India will soon be a water-stressed country and we all need to work towards our water security. There is an increasing awareness around the globe of the centrality of water to our lives. This awareness crosses political and social boundaries. In many places people have difficult access to drinking water. Often it is polluted. We need use water wisely to ensure that drinkable water is available for all, now and in the future. Water auditing is a mechanism for conserving water, which will grow in significance in the future as demand for water increases. . It is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water. It is therefore essential that any environmentally responsible institution examine its water use practices.

- **Auditing for Energy Management**

An energy audit is an inspection, survey and analysis of energy flows for energy conservation in a building, institution, process or system to reduce the amount of energy input into the system without negatively affecting the output. It shows where the power consumption is more in the given system. It can also be called as controlling of the power usage to avoid losses and maximize efficiency. Energy management (audit) approach is understanding energy costs, bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, and fuel and energy substitution. Energy cannot be seen, but we know it is there because we can sense its effects in the forms of heat, light and power. This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. An old incandescent bulb uses approximately 60W to 100W while

an energy efficient light emitting diode (LED) uses only less than 10 W. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation.

- **Auditing for Waste Management**

A waste audit is a methodically thought out process which can be used to determine the amount and types of waste that are generated by an organization. Information from these audits can help the organization to determine how we can reduce the amount of waste that an institution generates. In most work places, cardboard, paper, plastics, metals and food constitute the majority of what goes in the garbage. Pollution from waste is aesthetically unpleasant and results in large amount of litter in our communities which can cause health problems. Plastic bags and discarded ropes and strings can be very dangerous to birds and other animals. Solid waste can be divided into two categories: general waste and hazardous waste. General wastes include what is usually thrown away in homes and schools such as garbage, paper, tins and glass bottles. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals and petrol. Unscientific landfills may contain harmful contaminants that leach into soil and water supplies, and produce greenhouse gases contributing to global climate change. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

- **Auditing for Green Campus Management**

Green Campus is an environment which improves energy efficiency, conserving resources and enhancing environmental quality by educating for sustainability and creating healthy, living and learning environments. Green Campus rewards long term commitment to continuous environmental improvement from the campus community. Green colleges make a point to

account for sustainable living when designing and operating their buildings. Many of their facilities incorporate natural lighting, improve air quality, and reduce energy and water use. Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. Planting trees without consideration for their species, location, and maintenance will not result in all of their wished-for benefits. It is essential to plan where the trees are planted and to plan their ongoing maintenance in order to maximize future benefits and to ensure long-term tree survival and growth. Trees in a college yard improve air quality and can reduce temperatures with their cool shade. They are a small environmental investment that will pay dividends for decades to come. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. So while you are busy studying and working on earning those good grades, all the trees on campus are also working hard to make the air cleaner for us. Trees on our campus impact our mental health as well; studies have shown that trees greatly reduce stress, which a huge deal is considering that many students are under some amount of stress.

- **Auditing for Carbon Footprint**

Microcosms of the world at large, college campuses are great test beds for environmental change, and many students are working hard to get their administrations to take positive action. The initiatives that are emerging are models for the larger society, and the students pushing for them will be taking these lessons with them, too, as they enter the work force after graduation. Foremost on the minds of green-leaning students today is global warming, and many are joining hands to persuade their colleges to update policies and streamline operations so that their campuses can become part of the solution. Commutation of stakeholders has an impact on the environment through the emission of greenhouse gases into the atmosphere consequent to burning of

fossil fuels (such as petrol). The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions. The question is what should be done to reduce carbon emissions. Often the challenge lies in choosing just the right approach that will contribute most to the objective. Naturally, the results of these interventions also have to be monitored and assessed.

Many colleges want to reduce their carbon dioxide (CO2) emissions. But that's not so easy, given that a range of factors determine carbon emissions, including mobility, waste, and energy consumption. So, gaining insight into CO2 emissions is extremely important.

An important aspect of doing an audit is to be able to measure your impact so that we can determine better ways to manage the impact. In addition to the water, waste, energy and biodiversity audits we can also determine what our carbon footprint is, based on the amount of carbon emissions created. One aspect is to consider the distance and method traveled between home and college every day. It undertakes the measure of bulk of carbon dioxide equivalents exhaled by the organization through which the carbon accounting is done. It is necessary to know how much the organization is contributing towards sustainable development.

2.5 Methodology of Green Auditing

The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. The criteria, methods and recommendations used in the audit were based on the identified risks. The methodology includes: preparation and filling up of

questionnaire, physical inspection of the campus, observation and review of the documents, interviewing responsible persons and data analysis, measurements and recommendations. The methodology adopted for this audit was a three step process comprising of:

1. **Data Collection** – In data collection phase, exhaustive data collection was performed using different tools such as observation, survey communicating with responsible persons and measurements. Data collection was done from the primary sources.

   Following steps were taken for data collection:

- The team visited each department, centres, Library, canteen, gardens, campus etc.
- Data on the general information was collected by observation and interview.
- The power consumption of appliances was recorded by taking an average value in some cases.
- Plants were identified using standard taxonomic books.
- Waste generated was measured directly at the source of production.

2. **Data Analysis** - Detailed analysis of data collected include: computation of energy consumption, analysis of latest electricity bill of the campus, understanding the tariff plan provided by the Kerala State Electricity Board (KSEB). Data related to water usage were also analyzed using appropriate methodology.

3. **Recommendation** – On the basis of results of data analysis and observations, some steps for reducing power and water consumption were recommended. Proper treatment methods for waste were also suggested. The above target areas particular to the college was evaluated through questionnaire circulated among the students for data collection.

Five categories of questionnaires were distributed. The formats of these are given below.

2.6 Survey Forms

I

Green Auditing Nirmala College, Muvattupuzha
Auditing for Water Management

1. List uses of water in your college.
2. What are the sources of water in your college?
3. How many wells are there in your college?
4. No. of motors used for pumping water from each well?
5. What is the total horse power of each motor?
6. What is the depth of each well?
7. What is the present depth of water in each well?
8. How does your college store water?
9. Quantity of water stored in your overhead water tank? (in liters)
10. Quantity of water pumped every day? (in liters)
11. If there is water wastage, specify why.
12. How can the wastage be prevented / stopped?
13. Locate the point of entry of water and point of exit of waste water in your College.
14. Where does waste water come from?
15. Where does the waste water go?
16. What are the uses of waste water in your college?
17. What happens to the water used in your labs? Whether it gets mixed with ground water?
18. Is there any treatment for the lab water?
19. Whether green chemistry methods are practiced in your labs?
20. Write down four ways that could reduce the amount of water used in your college.
21. Record water use from the college water meter for six months.
22. Bimonthly water charges paid to water connections if any
23. No. of water coolers. Amount of water used per day? (in liters)
24. No. of water taps. Amount of water used per day?
25. No. of bath rooms in staff rooms, common, hostels. amount of water used per day?
26. No. of toilet, urinals. Amount of water used per day?
27. No. of water taps in the canteen. Amount of water used per day?
28. Amount of water used per day for garden use.
29. No. of water taps in laboratories. Amount of water used per day in each lab?

30 Total use of water in each hostel?
31 At the end of the period, compile a table to show how many litres of water have been used in the college for each purpose
32 Is there any water used for agricultural purposes?
33 Does your college harvest rain water?
34 If yes, how many rain water harvesting units are there?
35 How many of the taps are leaky? Amount of water lost per day?
36 Are there signs reminding people to turn off the water? Yes / No
37 Is there any waterless toilets? _____
38 How many water fountains are there? _____
39 How many water fountains are leaky? _____
40 Is drip irrigation used to water plants outside? YES/NO
41 How often is the garden watered?
42 Quantity of water used to watering the ground?
43 Quantity of water used for bus cleaning? (liters per day)
44 Amount of water for other uses? (items not mentioned above)
45 Area of the college land without tree/building canopy.
46 Is there any water management plan in the college?
47 Are there any water saving techniques followed in your college? What are they?
48 Please share Some IDEA for how your college could save more water.

II

Green Auditing @ Nirmala College, Muvattupuzha
Auditing for Energy Management

1. List ways that you use energy in your college. (Electricity, electric stove, kettle, microwave, LPG, firewood, Petrol, diesel and others).
2. Electricity bill amount for the last year
3. Amount paid for LPG cylinders for last one year
4. Weight of firewood used per month and amount of money spent? Also mention the amount spent for petrol/diesel/ others for generators?
5. Are there any energy saving methods employed in your college? If yes, please specify. If no, suggest some.
6. How much money does your college spend on energy such as electricity, gas, firewood, etc. in a month.(Record monthly for the year 2016).
7. How many CFL bulbs has your college installed? Mention use (Hours used/day for how many days in a month)
8. Energy used by each bulb per month? (for example- 60 watt bulb x 4hours x number of bulbs = kwh).
9. How many LED bulbs are used in your college? Mention the use (Hours used/day for how many days in a month)
10. Energy used by each bulb per month? (kwh).

11. How many incandescent (tungsten) bulbs have your college installed? Mentions use (Hours used/day for how many days in a month)
12. Energy used by each bulb per month? (kwh).
13. How many fans are installed in your college? Mention use (Hours used/day for how many days in a month)
14. Energy used by each fan per month? (kwh)
15. How many air conditioners are installed in your college? Mention use (Hours used/day, for how many days in a month)
16. Energy used by each air conditioner per month? (kwh).
17. How many electrical equipments including weighing balance are installed your college? Mention the use (Hours used/day for how many days in a month)
18. Energy used by each electrical equipment per month? (kwh).
19. How many computers are there in your college? Mention the use (Hours used/day for how many days in a month)
20. Energy used by each computer per month? (kwh)
21. How many photocopiers are installed by your college? Mention use (Hours used/day for how many days in a month).
22. How many cooling apparatus are in installed in your college? Mention use(Hours used/day for how many days in a month)
23. Energy used by each cooling apparatus per month? (kwh) Mention use (Hours used/day for how many days in a month)
24. Energy used by each photocopier per month? (kwh) Mention the use (Hours used/day for how many days in a month)how many inverters your college installed? Mention use (Hours used/day for how many days in a month)
25. Energy used by each inverter per month? (kwh)
26. How many electrical equipment are used in different labs of your college? Mention the use (Hours used/day for how many days in a month)
27. Energy used by each equipment per month? (kwh)
28. How many heaters are used in the canteen of your college ? Mention the use (Hours used/day for how many days in a month)
29. Energy used by each heater per month? (kwh)
30. No of street lights in your college?
31. Energy used by each street light per month? (kwh)
32. No of TV in your college and hostels?
33. Energy used by each TV per month? (kwh)
34. Any other item that uses energy (Please write the energy used per month) Mention the use (Hours used/day for how many days in a month)
35. Are any alternative energy sources/nonconventional energy sources employed / installed in your college? (photovoltaic cells for solar energy, windmill, energy efficient stoves, etc.,) Specify.
36. Do you run “switch off” drills at college?
37. Are your computers and other equipment put on power-saving mode?

38. Does your machinery (TV, AC, Computer, weighing balance, printers, etc.) run on standby mode most of the time? If yes, how many hours?
39. What are the energy conservation methods adapted by your college?
40. How many boards displayed for saving energy awareness?
41. How much ash is collected after burning fire wood per day in the canteen?
42. Write a note on the methods/practices/adaptations by which you can reduce the energy use in your college campus in future.

Calculation of energy for electrical appliances

Appliance	Power	Usage per	Number of	Average	Average
Incandescent	60 watt				
CFL	18 W				
Microwave	1000W				
Stove	3000W				
Kettle	2500W				

III

Green Auditing @ Nirmala College, Muvattupuzha
Auditing for Waste Management

- What is the total strength of students, teachers and Non teaching staff in your College?

No. of Students No. of Teachers No. Non teaching staff

Gents
Ladies
Total

Which of the following are available in your College? Give area occupied and number

Garden area	Garbage dump (number)
Play ground area	Laboratory
Kitchen	Canteen
Toilets (number)	Car/scooter shed area
Number of class rooms	Office rooms
	Others (specify)

- Which of the following are found near your college?

Mark the level of disturbance it creates for the college in a scale of 1 to 9.
Municipal dump yard, Garbage heap, Public convenience, Sewer line,
Stagnant water, Open drainage, Industry – (Mention the type)
Bus / Railway station, Market / Shopping complex / Public halls

WASTE

Does your college generate any waste?
If so, what are they? How much quantity? Number or weight
E-waste, Hazardous waste (toxic), Solid waste, Dry leaves, Canteen waste,

Liquid waste, Glass, Unused equipment, Medical waste if any, Napkins, Others (Specify)

- Is there any waste treatment system in the college?
- Is there any treatment for toilet/urinal/sanitary napkin waste?

1 What is the approximate quantity of waste generated per day? (in Kilograms)

Office

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.				
2 - 10 kg.				
> 10 kg.				

Laboratories

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.				
2 - 10 kg.				
> 10 kg.				

Canteen / kitchen

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.				
2 - 10 kg.				
> 10 kg.				

2 Why waste is a problem?

3 Whether waste is polluting ground/surface water? How?

4 Whether waste is polluting the air of the college? How?

5 How is the waste generated in the college managed? Methods

1 Composting, 2. Recycling, 3. Reusing, 4. Others (specify)

6 How many separate boxes do you think you would need to put into a classroom to start a waste segregation and recycling campaign?

What should be the use for each box? (Develop a colour code with reasons)

7 Do you use recycled paper in College?

8 Is there any waste wealth program practiced in the college?

9 How would you spread the message of recycling to others in the community? Have you taken any initiatives? If yes, please specify.

10 Can you achieve zero garbage in your college? (Reduce ,Recycle, Reuse, Refuse) If yes, how?

IV
Green Auditing @ Nirmala College, Muvattupuzha
Auditing For Green Campus Management

1. Is there a garden in your college? Area?
2. Do students spend time in the garden?
3. List the plants in the garden, with approx. numbers of each species.
4. Suggest plants for your campus. (Trees, vegetables, herbs, etc.)
5. List the species planted by the students, with numbers.
6. Whether you have displayed scientific names of the trees in the campus?
7. Is there any plantations in your campus? If yes specify area and type of plantation.
8. Is there any vegetable garden in your college? If yes how much area?
9. Is there any medicinal garden in your college? If yes how much area?
10. What are the vegetables cultivated in your vegetable garden? (Mention the quantity of harvest in each season)
11. How much water is used in the vegetable garden and other gardens? (Mention the source and quantity of water used).
12. Who is in charge of gardens in your college?
13. Are you using any type of recycled water in your garden?
14. List the name and quantity of pesticides and fertilizers used in your gardens?
15. Whether you are doing organic farming in your college? How?
16. Do you have any composting pit in your college? If yes What are you doing with the compost generated?
17. What do you doing with the vegetables harvested? Do you have any student market?
18. Is there any botanical garden in your campus? If yes give the details of campus flora.
19. Give the number and names of the medicinal plants in your college campus.
20. Any threatened plant species planted/conserved?
21. Is there a nature club in your college? If yes what are their activities?
22. Is there any arboretum in your college? If yes details of the trees planted.
23. Is there any fruit yielding plants in your college? If yes details of the trees planted.
24. Is there any groves in your college? If yes details of the trees planted.
25. Is there any irrigation system in your college?
26. What is the type of vegetation in the surrounding area of the college?
27. What are the nature awareness programmes conducted in the campus?(2016-17)
28. What is the involvement of students in the green cover maintenance?
29. What is the total area of the campus under tree cover?under tree canopy?
30. Share your IDEAS for further improvement of green cover.

V
Green Auditing @ Nirmala College, Muvattupuzha
Auditing for Carbon Footprint

1. What is the total strength of students and teachers in your College?

No. of Students	No. of Teachers	No. of Non teaching staff
Gents		
Ladies		
Total		

2. Total Number of vehicles used by the stakeholders of the college.(per day)
3. No. of cycles used
4. No. of two wheelers used (average distance travelled and quantity of fuel and amount used per day)
5. No. of cars used (average distance travelled and quantity of fuel and amount used per day)
6. No. persons using common (public) transportation (average distance travelled and quantity of fuel and amount used per day)
7. No. of persons using college conveyance by the students, non teaching staff and teachers (average distance travelled and quantity of fuel and amount used per day)
8. Number of parent-teacher meetings in an year? Parents turned up (approx.)
9. Number of visitors with vehicles per day?
10. Number of generators used per day (hours). Give the amount of fuel used perday.
11. Number of LPG cylinders used in the canteen (Give the amount of fuel used per day and amount spent).
12. Quantity of kerosene used in the canteen/labs (Give the amount of fuel used per day and amount spent).
13. Amount of taxi/auto charges paid and the amount of fuel used per month for the transportation of vegetables and other materials to canteen.
14. Amount of taxi/auto charges paid per month for the transportation of office goods to the college.
15. Average amount of taxi/auto charges paid per month by the stakeholders of the college.
16. Use of any other fossil fuels in the college (Give the amount of fuel used per day and amount spent).
17. Suggest the methods to reduce the quantity of use of fuel used by the stakeholders/students/teachers/non teaching staff of the college.

Chapter 3

Audit Stage

In Nirmala College, Muvattupuzha green auditing was done with the help of CMJ eco-associates involving different student groups and staff. A training programme was organized to orient the staff and students to collect the data for green auditing. The green audit began with the teams walking around examining all the different facilities of the college, identifying the different types of appliances and utilities (lights, taps, toilets, fridges, etc.), as well as measuring the usage per item (Watts indicated on the appliance or measuring water from a tap) and identifying the relevant consumption patterns (such as how often an appliance is used) and their impacts. The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances. Data collection was done in the sectors such as Energy, Waste, Greening, Carbon footprint and Water use. College records and documents were verified several times to clarify the data received through survey and discussions. The whole process was completed within five months from 2016 November to March, 2017.

3.1 Students and Staff Involved in Green Auditing

General Co-Ordinator Dr. T. M Joseph, Principal

Main Conveners:- Fr. Francis Kannadan, Dr. Johny Scaria, Dr T. M . Jacob

1. Water Management

Faculty In Charge : Biju Peter, Mathews K. Manayani

Students

Sl No	Name	Department
1	Sachin Sebastian	Chemistry
2	Denson Dominic	Chemistry
3	Nalin Kumar CV	Chemistry
4	Thomaskutty MV	Chemistry
5	Jithin P	Chemistry
6	Roshny Roy	Chemistry
7	Minu Mary Francis	Chemistry
8	Kavitha J	Chemistry
9	Delna Elizabeth	Chemistry
10	Aniet Tomy	Chemistry
11	Nimmy Aliyas	Chemistry
12	Sijna Moideen	Chemistry
13	Aswathy Nair	Chemistry
14	Alisha Ann Mary	Chemistry
15	Nalina Roy	Chemistry
16	Athira MS	Chemistry
17	AshnaChacko	Chemistry
18	Jacob Sunny	Chemistry

2. Green Campus Management

Faculty In Charge: Dr. Sr. Tessy Joseph, Ms. Jaiby Cyriac, Ms. Reshmy T.R, Ms. Jisha George

Students

Sl No	Name	Department
1	Akash Shine Thomas	Botany
2	AnjanaSubash	Botany
3	Juby Baby	Botany
4	Kousalya C.	Botany
5	Aparna Saji	Botany
6	Sreeya Sajan	Botany
7	Syalini Sivan	Botany
8	Thushara Ramakrishnan	Botany
9	Mathew Thomas	Botany
10	Mohamed Fayiz	Botany
11	Sreejith George	Botany
12	Vignesh P.B.	Botany
13	AnjanaSen	Botany

14	Aleena Joy	Botany
15	Aneesha Subair	Botany
16	Aswathy Appukuttan	Botany
17	Fathima Muhammed	Botany
18	Ashna Sunny	Botany
19	Doonia Johnson	Botany
20	Hilda Jose	Botany

3. Carbon Footprint

Faculty In Charge: - Ambily Elizabeth (Dept of Zoology)
Titu Thomas (Dept of Physics)

Students

Sl No	Name	Department
1	Oormila Antony	Zoology
2	Rosemary Joseph	Zoology
3	Leema Rose Mathew	Zoology
4	Agnes T Sebastian	Zoology
5	Aruna Mathew	Zoology
6	Baby krishna P K	Zoology
7	Anjana K Ajayan	Zoology
8	Merin Francis	Zoology
9	Greeshma Shaji	Zoology
10	Abhirami C Nair	Zoology
11	Nidhin P Ravi	Physics
12	Amalraj K	Physics
13	Mahesh M	Physics
14	Sidharth Manmadhan	Physics
15	Anusree S Nair	Physics
16	Kiran J Danny	Physics
17	Akhil K K	Physics
18	Sravan N Suresh	Physics
19	Sabreen S Basheer	Physics
20	Aparna Raj C	Physics
21	Annmary N S	Physics
22	Karthika Murali	Physics
23	Dona Tomy	Physics
24	Alanda Prince	Physics
25	Aleena Benny	Physics
26	Nidhin P Ravi	Physics

4. Waste Management

Faculty In Charge: Dr. Nibu Thomson, Ms. Seema Joseph
Mr. Shaimon Joseph

Students

Sl No	Name	Department
1	Basilmon M Baby	Mathematics
2	Chikku Ramanan	Mathematics

3	DeepaShaji	Mathematics
4	Rose MaryJaic	Mathematics
5	Abhijith Ravi	Mathematics
6	AnjoJenus	Mathematics
7	Sarath A S	Mathematics
8	Carolin Therese	Mathematics
9	Sreelakshmi K S	Zoology
10	Nibin Sumedha	Zoology
11	MariyaSaju	Zoology
12	Aparna Suresh	Economics
13	Alby Thomas	Economics
14	Santhya G	Bcom
15	Akhila Joseph	BA English
16	Amrutha C S	BA Hindi
17	Aparna Ashok	BA Malayalam
18	Gokul Prasad	Bcom Tax
19	Anantha krishnan	Bcom Tax
20	Ayoob C A	Physics
21	Georgin Sabu	Physics Vocational
22	Sandeep T A	BCA

5. Energy Management

Faculty In Charge: Dr.George James T, Philip Augustine, Dr.Shibin Mohan N, Dr.vinod K.V, Dr.Neerada Maria Kurian,Jasmine Mary P.J, Aby Thomas, Jobin Jose, Arun Geo Augustine

Students

Sl No	Name	Department
1	Jerin Thankachan	BSc Physics Model I
2	Nevin Abraham	BSc Physics Model I
3	Aiswarya Nair	BSc Physics Model I
4	Aleena Dominic	BSc Physics Model I
5	Aleena Jose	BSc Physics Model I
6	Ambili George	BSc Physics Model I
7	Anjaly P S	BSc Physics Model I
8	Aparna Baby	BSc Physics Model I
9	Aveena Abee	BSc Physics Model I
10	Ayana Ayyappan	BSc Physics Model I
11	Jijitha Rajan	BSc Physics Model I
12	Sandhra Sebastian	BSc Physics Model I
13	Thulasi Kv	BSc Physics Model I
14	Ajmal Anwar	BSc Physics Model I
15	Akhil Jose	BSc Physics Model I
16	Akhil P S	BSc Physics Model I
17	Anandu Chandran	BSc Physics Model I
18	Emmanuel K	BSc Physics Model I
19	Jerin M Joy	BSc Physics Model I

20	Shibin Thomas	BSc Physics Model I
21	Stephan Jose	BSc Physics Model I
22	Tijin Kurian	BSc Physics Model I
23	Aiswarya V	BSc Physics Model I
24	Anaswara Sabu	BSc Physics Model I
25	Anjaly Sunny	BSc Physics Model I
26	Anjaly Vijayan	BSc Physics Model I
27	Chithra Aloysius	BSc Physics Model I
28	Lorain Thomas	BSc Physics Model I
29	Sebin John	BSc Physics Model I

3.2 Student Clubs and Forums Involved

Nature Club, Tourism Club, Women's Cell, Career Guidance and Placement Cell, Film and Dramatic club, Oratory club Mentoring Cell, Music Club, Folklore club, ED Club, Varnasala, Encon Club, N.S.S, N.C.C, Quiz club, CSM and Department level Associations.

3.3 Comments on Site Tour

Site inspection was done along with students and staff. Audit team visited laboratories, libraries, class rooms, botanical garden, college campus, agricultural fields, medicinal plant garden, spices garden, solar power generation fields, play grounds etc. Questionnaires were answered during the site tour. Students and staff took much interest in the data collection process. It was an environmental awareness program for the students who participated in the green auditing. It was quite interesting and fascinating. The experience of green auditing was totally a new experience for most of the students. They have shared their expectations about a green campus and gave suggestions for the audit recommendations. Data collected in different intervals were consolidated later.

3.4 Review of Documents and Records

Data verification was done with office records. Documents such as admission registers, registers of electricity and water charge remittance, furniture register, laboratory equipment registers, purchase register, and audited statements of the college were examined for data collection and verifications. College

calendars, college magazines, annual report of the college and NAAC self-assessment reports, UGC report etc. were also verified as part of data collection.

3.4 Review of Policies

Discussions were made with the college management regarding their policies on environmental management. Reviews of existing policies were also done. Future plans of the college and basis for new policies to be adopted were also discussed. The management would formulate a revised environment /green policy for the college in the light of green auditing. The purpose of the green audit was to ensure that the practices followed in the campus are to be in accordance with the green Policy adopted by the institution.

3.5 Interviews

In order to collect information for green auditing different audit groups interviewed office staff, Principal, teaching and non-teaching staff, students, parents and other stakeholders of the college. Discussions were also held with the PTA office bearers to clarify doubts regarding certain aspects.

3.6 Site inspection

College and its premises were visited and analyzed by the audit-teams several times to gather information. Campus trees were counted and identified. Vegetable garden, banana garden, play grounds, canteen, library, office rooms and parking grounds were also visited to collect data. Number and type of vehicles used by the stakeholders were counted and fuel consumption for each vehicle was verified with the user. Number of LPG cylinders used in labs, canteen and hostel kitchen were also counted. Leakage of a few water taps were noticed during the site inspection. Energy wastage and misuses were also noted.

Chapter 4

Post Audit Stage

The base of any green audit is that its findings are supported by documents and verifiable information. The audit process seeks, on a sampled basis, to track past actions, activities, events, and procedures to ensure that they are carried out according to systems requirements and in the correct manner. Although green audits are carried out using policies, procedures, documented systems and objectives as a test, there is always an element of subjectivity in an audit. The essence of any green audit is to find out how well the environmental organisation, environmental management and environmental equipment are performing. Each of the three components is crucial in ensuring that the organisation's environmental performance meets the goals set in its green policy.

4.1 Key Findings and Observations

a) Water

❖ Main water uses in the campus

- Drinking purpose.
- Toilets and Wash areas (including hostel and canteen).
- Labs.
- Gardening and agriculture.

- Construction purpose.
- Cooking purpose in hostels and canteen.

❖ No water treatment system in place.
❖ Water cooler with drinking water filtration is installed (9 numbers).
❖ Number of urinals and toilets – 194
❖ Number of waterless urinals - Nil
❖ Number of bathrooms – 21
❖ Number of water taps – 659 (21 taps are leaky)
❖ Water taps in laboratories - 59
❖ Number of wells – 1 tube well and 5 open wells
❖ Number of ponds - 1
❖ Water pumps – 5 (7.5 hp x 2, 10 hp, 5 hp x 2)
❖ Depth of each well

Little flower hostel - 28ft
Main pond near L.F hostel - 18.5 ft
Small pond near L.F hostel - 8.5 ft
Jeevajyothi hostel (2-ponds) - 9 ft (each)

❖ Quantity of water pumped – 95000 liters/day
❖ Total water in the overhead tanks – 151364 L
❖ Water charges paid – No water charges(No municipal water supply, Using water from own well)
❖ Number of water tanks for water storage -20

Capacity of overhead water tanks

- Main block Water tank - 32906 L
- PG block water tank - 6480 L
- In front of main office (2) - 6000 L
- On the top of the golden jubilee block (2 tanks) - 6000 L
- In front of sports hostel - 1000 L
- Little flower hostel - 18700 L
- Little flower hostel (2 synthetic tanks) - 10000 L
- In front of canteen - 6440 L
- MCA block (3 tanks) 6000 L
- Diamond jubilee Block(2 tanks)- 41838 L
- Jeevajyothi Hostel(2 tanks) - 16000 L

Total overhead water tank capacity 151364 L

Reasons for water wastage

- Leakages from taps
- Over use of water
- Overflow of water from overhead tanks

Overall utilization of water in the College

Sections	Water Use/day
Toilets and urinals	19400 Ltr
Hostel	33300 Ltr
Bathrooms	11000 Ltr
Canteen	5,000 Ltr
Garden	5000 Ltr
Laboratories	12,300 Ltr
Drinking	1000 Ltr
Leakage	727 Ltr
Construction work	5000 Ltr
Total	**92727 Ltr**

Suggestions of the college to save water

- Rain water harvesting systems should be implemented.
- Posters could be placed at the wash areas as well as toilets to make the students aware about the value of water resources.
- The water over flowing from the tank should be collected and reused for gardening or any other purposes.
- Automated sensors can be installed in order to prevent the over flow of water from tanks.
- Awareness campaigns can be held in the campus for the students to save water.
- Automated taps could be used so that usage of water can be reduced.
- Awareness campaigns can be conducted among students.
- Periodical maintenance of water taps should be done in order to prevent the leakage of water through taps.

b) Energy

- Electricity charges Rs.100000/month
- Number of Gas cylinders used per month – 60
- Cost of Gas cylinders used Rs. 39000/month
- Weight of firewood used – 1210 Kg/month
- Cost of firewood - 9600/month (1210 kg)
- Number of Generators – 5 (12-15 L Diesel/day)
- Power generated by the Generator - 3852
- Cost of generator fuel – Rs.750/day
- Total cost of energy – Rs. 171100/month
- Total number of CFL bulbs – 432
- Number of LED lights – 118
- Incandescent bulbs – 39
- Number of fans – 814
- Number of Air conditioners - 25
- Number of Tube lights – 656
- Total Electrical Equipments – 217
- Number of Computers and laptops – 347
- Number of Photocopiers – 6
- Number of inverters – 60
- Number of heaters used – 30
- Number of water pumps – 5
- Power used – 2941 kWh
- Number of Televisions – 21
- Total electric power used – **17856.97**kWh/month
- Energy generation by solar panels – 25 KV Solar cells- 3000 kWh/month

POWER SOURCE		**Total Power Consumption**	
SOLAR	**3000**	Inverter	**591.63**
KSEB	**11000**	Eelctrical Equipments	**14324.34**
GENERATOR	**3952**	Water Pump	**2941.00**
Total	**17952**		**17856.97**

Energy usage in the college

ENERGY USAGE OF CFL BULBS IN THE COLLEGE

Department/Room	APPLIANCES (A)	POWER IN WATT(B)	NO OF APPLIANCES (C)	Average Usage/ day (D)	ENERGY USAGE/MONTH(kwh)
MCA	CFL	15	36	3.33	53.946
MCA (AUDITORIUM/SEMINAR HALL)	CFL	15	26	1.26	14.742
MAIN AUDITORIUM/SEMINAR/AUDIO VISION HALL/	CFL	15	49	0.66	14.553
COMPUTER LAB	CFL	15	25	1.26	14.175
PRINCIPAL OFFICE	CFL	15	5	3.33	7.4925
VIP/SUIT ROOM	CFL	15	3	0.66	0.891
WAITING ROOM	CFL	15	1	3.33	1.4985
CHEMISTRY	CFL	15	3	3.33	4.4955
CAMPUS	CFL	15	19	3.33	28.4715
IGNOU	CFL	15	1	2.12	0.954
PLACEMENT CELL	CFL	15	1	3.33	1.4985
DINING AREA	CFL	20	2	1.26	1.512
WASH ROOM	CFL	15	4	3.33	5.994
BCA	CFL	15	1	3.33	1.4985
STATISTICS	CFL	15	3	3.33	4.4955
HINDI	CFL	15	1	3.33	1.4985
CHAPPEL /YOGA CENTRE	CFL	20	2	0.66	0.792
COMMERCE	CFL	15	13	2.16	12.636
BOTANY	CFL	15	1	3.33	1.4985
LIBRARY/ PHOTOSTAT	CFL	15	22	3.33	32.967
CANTEEN	CFL	20	1	3.33	1.998
GYM	CFL	15	1	3.12	1.404
LADIES HOSTEL	CFL	15	68	3.12	95.472
BOYS HOSTEL	CFL	15	128	3.33	191.808
MAIN AUDITORIUM	CFL	100	4	2.26	27.12
CONFERENCE HALL	CFL	20	12	2.16	15.552
	TOTAL ENERGY USAGE IN MONTH(kWh)				538.9635

ENERGY USAGE OF LED BULBS IN COLLEGE

Department/Room	APPLIANCES (A)	POWER IN WATT(B)	NO OF APPLIANCES (C)	Average Usage / day (D)	ENERGY USAGE /MONTH(kwh)
AUDITORIUM (DJ BLOCK)	LED	9	46	0.33	4.0986
CANTEEN	LED	9	2	1.26	0.6804
COMMERCE(SF)	LED	9	1	1.26	0.3402
GYM	LED	9	3	0.66	0.5346

LADIES HOSTEL	LED	9	36	1.16	11.275
LADIES HOSTEL	LED	15	3	1.26	1.701
MAIN AUDITORIUM	LED	50	1	0.16	0.24
MCA BLOCK	LED	9	4	2.26	2.4408
MHRM	LED	9	2	2.26	1.2204
TOURISM	LED	9	6	2.6	4.212
CAMPUS	LED	9	14	2.26	8.5428
	TOTAL ENERGY USAGE IN MONTH(kWh)				35.286

ENERGY USAGE OF INCADESCENT BULBS IN COLLEGE

Department/Room	APPLIANCE (A)	POWER	NO OF	Avera	ENERG
AUDIO VISION HALL	INCADESCENT BULB	40	1	0.66	0.792
BCA	INCADESCENT BULB	40	1	1.26	1.512
CAMPUS	INCADESCENT BULB	40	3	2.16	7.776
COMM.ENG	INCADESCENT BULB	40	2	3.33	7.992
COMMERCE	INCADESCENT BULB	40	1	3.33	3.996
COMMERCE(SF)	INCADESCENT BULB	40	1	3.33	3.996
GIRLS TOILET	INCADESCENT BULB	40	2	3.33	7.992
GYM	INCADESCENT BULB	40	1	1.26	1.512
HINDI	INCADESCENT BULB	40	2	3.33	7.992
LADIES HOSTEL	INCADESCENT BULB	40	1	2.26	2.712
LIBRARY GROUND FLOOR	INCADESCENT BULB	40	1	2.16	2.592
MAIN AUDITORIUM	INCADESCENT BULB	40	2	0.33	0.792
MALAYALAM	INCADESCENT BULB	40	1	2.26	2.712
REST ROOM AND WASH	INCADESCENT BULB	40	5	2.26	13.56
WASHROOM (BOYS)	INCADESCENT BULB	40	5	2.36	14.16
BCA	ZERO BULB	10	1	1.66	0.498
AUDITORIUM (DJ BLOCK)	HALOGEN BULB	750	2	0.12	5.4
PHYSICS	TABLE LAMP	25	5	2.66	9.975
BASKET BALL COURT	HALOGEN BULB	750	2	0.12	5.4
	TOTAL ENERGY USAGE IN MONTH(kWh)				101.36

ENERGY USAGE OF FANS IN COLLEGE

Department/Room	APPLIANCES (A)	POWER IN WATT(B)	NO OF APPLIANCES (C)	Average Usage / day (D)	ENERGY USAGE /MONTH(kwh)
AUDIO VISION HALL	WALL FAN	55	13	0.66	14.157
AUDITORIUM (DJ BLOCK)	FAN	55	35	0.33	19.057
BCA	FAN	55	13	1.26	27.027
BOTANY	FAN	55	18	1.26	37.422
CANTEEN	FAN	55	13	0.66	14.157
CHAPPEL	FAN	55	6	0.13	1.287
CHEMISTRY	FAN (EXHAUST)	160	4	2.26	43.392
	FAN/TABLE FAN	53	17	1.56	42.166
COMM ENGLISH SF	FAN	55	15	2.26	55.935

COMMERCE	FAN	55	21	2.19	75.883
COMMERCE(SF)	FAN /	55	46	1.33	100.94
COMPUTER LAB	FAN	55	20	1.33	43.89
	FAN (EXHAUST)	140	5	1.29	27.09
CONFERENCE HALL	FAN	55	3	0.16	0.792
DIGITAL LIBRARY	FAN	55	8	1.12	14.784
DINING AREA	FAN	55	2	0.66	2.178
ECONOMICS	FAN/TABLE FAN	55	16	1.26	33.264
ENGLISH	FAN	55	8	1.26	16.632
FOLKLORE MUSEUM	FAN	55	1	0.16	0.264
GYM	FAN	55	1	0.66	1.089
HINDI	FAN	55	11	1.26	22.869
HOSTEL (BOYS)	FAN	55	110	2.12	384.78
HOSTEL (LADIES)	FAN	55	109	2.12	381.28
IGNOU	FAN	55	1	2.16	3.564
IQAC	FAN	55	1	0.99	1.6335
KIOSK	TABLE FAN	55	1	1.26	2.079
LADIES HOSTEL	TABLE FAN	55	1	1.25	2.0625
LIBRARY	FAN	55	30	2.26	111.87
MAIN AUDITORIUM	WALL FAN	55	23	0.33	12.523
MALAYALAM	FAN	55	14	1.24	28.644
MANAGER	FAN	55	2	1.24	4.092
MATHEMATICS	FAN	55	12	1.16	22.968
MCA	FAN	55	67	2.22	245.42
MCA (AUDITORIUM)	FAN	55	12	0.33	6.534
MCA (SEMINAR HALL)	FAN	55	4	0.33	2.178
MHRM	FAN	55	7	3.33	38.461
PHYSICS	FAN	55	36	3.33	197.80
PLACEMENT CELL	FAN	55	2	3.33	10.989
PRINCIPAL/VICE	FAN	55	11	7.2	130.68
PUNNAKOTTIL HALL	FAN	55	6	0.3	2.97
SEMINAR HALL	FAN	55	21	2	69.3
STATISTICS	FAN	55	9	3.33	49.450
STORE AND EXAM ROOM	FAN	55	2	0.66	2.178
TOURISM MANAGEMENT	FAN	55	28	3.33	153.84
VIP/GUEST ROOM	FAN	55	4	0.16	1.056
WASH ROOM (BOYS)	FAN (EXHAUST)	160	2	3.33	31.968
WASH ROOM (GIRLS)	FAN	55	4	3.33	21.978
ZOOLOGY	FAN	55	19	3.33	104.39
	TOTAL ENERGY USAGE IN MONTH(kWh)				2618.9

ENERGY USAGE OF AIR CONDITIONERS IN COLLEGE

Department/Room	APPLIANCES (A)	POWER	NO OF	Avera	ENERG
AUDIO VISION HALL	A/C (CENTRALISED)	10000	1	2	600
BCA	AC	1000	5	2.26	339
COMMERCE	AC	1000	3	0	0

CONFERENCE HALL	A/C (CENTRALISED)	3000	1	0.16	14.4
MCA OFFICE	AC	1000	3	2.26	203.4
MCA PARLOUR	AC	1000	2	0.16	9.6
HOSTEL (BOYS) OFFICE	AC	1000	1	1	30
COMPUTER LAB	A/C (CENTRALISED)	1000	2	0.99	59.4
MCA (AUDITORIUM)	A/C (CENTRALISED)	6000	2	0.33	118.8
MCA (SEMINAR HALL)	A/C (CENTRALISED)	2000	1	0.33	19.8
SEMINAR HALL	AC	1000	4	0.16	19.2
	TOTAL ENERGY USAGE IN MONTH(kWh)				1413.6

ENERGY USAGE OF TUBE LIGHTS IN COLLEGE

Department/Room	APPLIANCES (A)	POWER	NO OF	Avera	ENERG
AUDIO VISION AND	TUBE	40	7	0.66	5.544
AUDITORIUM	TUBE	40	21	0.66	16.632
BCA	TUBE	40	56	0.66	44.352
BOTANY	TUBE	40	16	0.66	12.672
HOSTEL (BOYS)	TUBE	40	23	0.66	18.216
CAMPUS	TUBE	40	31	0.66	24.552
CANTEEN	TUBE	40	18	0.66	14.256
CHAPPEL	TUBE	40	5	0.88	5.28
CHEMISTRY	TUBE	40	59	0.88	62.304
COMM ENGLISH SF	TUBE	40	7	0.88	7.392
COMMERCE	TUBE	40	49	0.88	51.744
COMPUTER LAB	TUBE	40	17	0.88	17.952
DINING AREA AND EXAM	TUBE	40	6	0.66	4.752
ECONOMICS	TUBE	40	14	0.66	11.088
ENGLISH	TUBE	40	5	0.66	3.96
HINDI	TUBE	40	4	0.66	3.168
IQAC	TUBE	40	1	0.66	0.792
KIOSK	TUBE	40	1	0.12	0.144
HOSTEL(LADIES)	TUBE	40	51	2.12	129.74
LIBRARY	TUBE	40	39	0.66	30.888
MALAYALAM	TUBE	40	14	0.66	11.088
MANAGER AND SUIT ROOM	TUBE	40	5	0.66	3.96
MATHEMATICS	TUBE	40	9	0.89	9.612
MCA	TUBE	40	40	0.66	31.68
MCA	TUBE	40	11	0.89	11.748
MHRM	TUBE	40	3	0.89	3.204
PHYSICS	TUBE	40	41	0.89	43.788
PRINCIPAL/ VICE	TUBE	40	17	2.26	46.104
PUNNAKOTTIL/SEMINAR	TUBE	40	22	0.86	22.704
STATISTICS	TUBE	40	11	0.89	11.748
TOURISM	TUBE	40	18	0.66	14.256
WASH ROOM (BOYS AND	TUBE	40	5	2.26	13.56
ZOOLOGY	TUBE	40	30	1.12	40.32
	TOTAL ENERGY USAGE IN MONTH(kWh)				729.20

ENERGY USAGE OF COMMPUTERS IN THE COLLEGE

Department/Room	APPLIANCES (A)	POWER	NO OF	Avera	ENERG
BCA	COMPUTER WITH	180	76	2.06	845.42
	CPU	120	7	2.06	51.912
	LAPTOP	180	4	2.06	44.496
COMPUTER LAB	COMPUTER WITH	180	66	2.06	734.18
BOTANY	COMPUTER WITH	180	3	2.06	33.372
	LAP TOP	150	1	2.06	9.27
BOYS HOSTEL	COMPUTER WITH	150	2	1.5	13.5
BURSAR	COMPUTER WITH	180	1	2.06	11.124
CHEMISTRY	COMPUTER WITH	180	7	2.06	77.868
COMMERCE	COMPUTER WITH	180	6	1.16	37.584
	LAPTOP	150	1	2.06	9.27
COMMERCE(SF)	CPU	120	1	2.06	7.416
CONFERENCE HALL	COMPUTER WITH	180	8	2.06	88.992
DIGITAL LIBRARY	COMPUTER WITH	180	18	2.06	200.23
ECONOMICS	COMPUTER WITH	250	2	2.06	30.9
	LAPTOP	12	1	2.06	0.7416
ENGLISH	LAPTOP	12	1	2.06	0.7416
HINDI	COMPUTER WITH	150	4	2.06	37.08
	LAPTOP	12	1	2.06	0.7416
IGNOU	COMPUTER WITH	180	1	2.06	11.124
IQAC	COMPUTER WITH	180	1	2.06	11.124
LIBRARY FIRST FLOOR	COMPUTER WITH	180	7	2.06	77.868
MATHEMATICS	COMPUTER WITH	180	2	2.06	22.248
MCA COMPUTER LAB	COMPUTER WITH	180	77	2.06	856.54
MCA OFFICE	COMPUTER WITH	180	4	1.16	25.056
MHRM	COMPUTER WITH	180	3	1.16	18.792
PHYSICS	COMPUTER WITH	180	8	1.14	49.248
	LAPTOP	12	2	1.89	1.3608
PRINCIPAL/VICE	COMPUTER WITH	180	19	1.26	129.27
SEMINAR HALL	COMPUTER WITH	180	2	1.16	12.528
STATISTICS	COMPUTER WITH	180	9	1.16	56.376
ZOOLOGY	LAPTOP	12	2	1.16	0.8352
		TOTAL ENERGY USAGE IN			3507.2

ENERGY USAGE OF PHOTOCOPIER IN COLLEGE

Department/Room	APPLIANCES (A)	POWER	NO OF	Avera	ENERG
EXAM ROOM	PHOTOSTAT	1200	1	0.66	23.76
IQAC	PHOTOSTAT	1200	1	0.66	23.76
OFFICE	PHOTOSTAT	1200	1	0.66	23.76
OFFICE ANNEX	PHOTOSTAT	1200	1	0.66	23.76
PHOTOSTAT ROOM	PHOTOSTAT	1200	1	0.66	23.76
VICE PRINCIPAL OFFICE	PHOTOSTAT	1200	1	0.66	23.76
		TOTAL ENERGY USAGE IN			142.56

ENERGY USAGE OF INVERTERS IN COLLEGE

Department/Room	APPLIANCES (A)	POWER	NO OF	Avera	ENERG
BCA	INVERTER/UPS	1000	6	0.26	46.8
BOTANY	INVERTER/UPS	1000	1	0.26	7.8
BURSAR	INVERTER/UPS	1000	1	0.26	7.8
COMMERCE	INVERTER/UPS	1000	1	0.26	7.8
COMMERCE(SF)	INVERTER/UPS	1000	1	0.26	7.8
COMPUTER LAB	INVERTER/UPS	850	1	0.26	6.63
	INVERTER/UPS	1000	1	0.26	7.8
DINING AREA	INVERTER/UPS	1000	1	0.26	7.8
LADIES HOSTEL	INVERTER/UPS	1000	1	0.26	7.8
	INVERTER/UPS	1000	1	0.26	7.8
OFFICE ANNEX	INVERTER/UPS	1000	1	0.26	7.8
PRINCIPAL OFFICE	INVERTER/UPS	1000	1	0.26	7.8
VICE PRINCIPAL OFFICE	INVERTER/UPS	1000	1	0.26	7.8
ZOOLOGY	INVERTER/UPS	3000	1	0.26	23.4
BOYS HOSTEL	INVERTER/UPS	2000	2	0.26	31.2
BOYS TOILET	INVERTER/UPS	1000	1	0.26	7.8
LIBRARY GROUND FLOOR	INVERTER/UPS	1000	3	0.26	23.4
DIGITAL LIBRARY	INVERTER/UPS	2000	1	0.26	15.6
	INVERTER/UPS	3000	2	0.26	46.8
	INVERTER/UPS	1000	3	0.26	23.4
ECONOMICS	INVERTER/UPS	2000	1	0.26	15.6
MCA	INVERTER/UPS	1000	1	0.26	7.8
MCA BLOCK	INVERTER/UPS	5000	1	0.26	39
PHYSICS	INVERTER/UPS	3000	1	0.26	23.4
STATISTICS	INVERTER/UPS	1000	1	0.26	7.8
	INVERTER/UPS	1000	1	0.26	7.8
BCA	INVERTER/UPS	1000	20	0.26	156
HINDI	INVERTER/UPS	1000	1	0.26	7.8
STATISTICS	INVERTER/UPS	1000	2	0.26	15.6
	TOTAL ENERGY USAGE IN MONTH(kWh)				591.63

ENERGY USAGE OF HEATERS IN COLLEGE

Department/Room	APPLIANCES (A)	POWER	NO OF	Avera	ENERG
BOTANY	HOT AIR OVEN	1000	1	0.33	9.9
	AUTO CLAVE	600	1	0.66	11.88
BOYS HOSTEL	HEATER	1000	3	1	90
	IRON BOX	750	3	1	67.5
CHEMISTRY	DISTILLED WATER	1000	1	0.33	9.9
	DRYER	500	1	0.33	4.95
	HEATING MANTLE	1000	1	0.33	9.9
	HOT AIR OVEN	1200	2	0.33	23.76
	OVEN	750	1	0.16	3.6
CHEMISTRY RESEARCH	HEATING MANTLE	200	1	0.33	1.98

LAB	INCUBATOR	250	1	0.66	4.95
DINING AREA	INDUCTION COOKER	1800	1	0.16	8.64
GROUND FLOOR	COFFEE MAKER	750	1	0.16	3.6
KIOSK	TEA MAKER	1000	1	0.16	4.8
LADIES HOSTEL	INDUCTION COOKER	1600	1	0.16	7.68
	OVEN	2000	1	0.33	19.8
PHYSICS	DISTILLED WATER	250	1	0.66	4.95
	HOT AIR OVEN	750	1	0.3	6.75
	INCUBATOR	200	1	0.66	3.96
	MUFFLE FURNACE	3000	1	0.16	14.4
ZOOLOGY	DISTILLED WATER	1000	1	0.16	4.8
	WAX BATH	1200	1	0.13	4.68
	AUTO CLAVE	1500	1	0.16	7.2
	INCUBATOR	1000	2	0.11	6.6
	TOTAL ENERGY USAGE IN MONTH(kWh)				336.18

ENERGY USAGE OF TELEVISIONS IN COLLEGE

Department/Room	APPLIANCES (A)	POWER	NO OF	Avera	ENERG
BCA	LED/LCD T V	55	2	0.66	2.178
BOTANY	LED/LCD T V	55	2	0.66	2.178
BOYS HOSTEL	CRT TV	150	1	0.66	2.97
	LED/LCD T V	55	2	0.33	1.089
BURSAR	LED/LCD T V	55	1	0.11	0.1815
COMMERCE	LED/LCD T V	55	1	0.33	0.5445
CORRIDOR	LED/LCD T V	55	1	0.16	0.264
ECONOMICS	LED/LCD T V	55	1	0.16	0.264
ENGLISH	LED/LCD T V	55	1	0.16	0.264
GYM	LED/LCD T V	55	1	0.33	0.5445
LADIES HOSTEL	LED/LCD T V	50	1	0.33	0.495
LIBRARY FIRST FLOOR	LED/LCD T V	60	1	0.33	0.594
	CRT TV	60	1	0.16	0.288
MAIN AUDITORIUM	LED/LCD T V	60	1	0.18	0.324
MCA OFFICE	LED/LCD T V	70	1	0.18	0.378
PRINCIPAL OFFICE	LED/LCD T V	60	2	0.16	0.576
VIP ROOM	LED/LCD T V	60	1	0.11	0.198
	TOTAL ENERGY USAGE IN MONTH(kWh)				13.330

ENERGY USAGE OF AMPLIFIERS AND CCTV DVR IN COLLEGE

Department/Room	APPLIANCES (A)	POWER	NO OF	Avera	ENERG
AUDIO VISION HALL	AMPLIFIER	250	1	0.16	1.2
AUDITORIUM (DJ BLOCK)	AMPLIFIER	1000	2	0.1	6
BURSAR	DVR + CCTV camera	250	1	24	180
COMMERCE(SF)	AMPLIFIERS	1000	1	0.16	4.8
LADIES HOSTEL	AMPLIFIER	250	1	0.16	1.2
MAIN AUDITORIUM	POWER AMPLIFIER	1500	1	0.51	22.95
	AMPLIFIER	1000	1	0.66	19.8
	TUNING SYSTEM	60	1	0.57	1.026

MCA	AMPLIFIER	1500	2	0.66	59.4
MCA (AUDITORIUM)	AMPLIFIER	2000	2	0.55	66
PUNNAKOTTIL HALL	AMPLIFIER	500	1	0.22	3.3
SEMINAR HALL	AMPLIFIER	200	2	0.25	3
	TOTAL ENERGY USAGE IN MONTH(kWh)				368.67

ENERGY USAGE OF OTHER ELECTRICAL EQUIPMENTS IN COLLEGE

Department/Room	APPLIANCES (A)	POWER	NO OF	Avera	ENERG
AUDIO VISION HALL	LCD PROJECTOR	250	2	0.15	2.25
AUDITORIUM (DJ BLOCK)	PROJECTOR	250	1	0.15	1.125
BCA	24 PORT SWTICH	220	1	1.66	10.956
	MODEM	20	1	1.66	0.996
	MODEM	20	1	1.65	0.99
	PRINTER	50	3	1.66	7.47
	PROJECTOR	250	1	1.5	11.25
	STABILISER	40	3	3.33	11.988
BOTANY	CENTRIFUGE	250	1	0.16	1.2
	ELECTRONIC	50	1	0.1	0.15
	FRIDGE	250	1	5	37.5
	FRIDGE	250	1	3.33	24.975
	LAMINAR CHAMBER	300	1	0.15	1.35
	PRINTER	50	2	0.16	0.48
	SAUXHLET	1500	1	0.25	11.25
	SCANNER	50	1	0.16	0.24
BOYS HOSTEL	FRIDGE	180	3	22	356.4
	PRINTER	25	1	0.16	0.12
	WASHING MACHINE	50	1	0.25	0.375
BURSAR	PRINTER	700	1	0.16	3.36
CANTEEN	FREEZER	600	2	24	864
	GRINDER	1200	1	0.28	10.08
	MIXER GRINDER	900	1	0.14	3.78
CHEMISTRY	CENTRIFUGE	60	2	0.14	0.504
	CENTRIFUGE	180	1	0.33	1.782
	COLORIMETER	150	1	0.15	0.675
	CONDUCTIVITY	140	3	0.11	1.386
	FRIDGE	180	1	22	118.8
	LAMINAR FLOW	500	1	0.1	1.5
	PH METER	140	1	0.12	0.504
	PRINTER	750	1	0.22	4.95
	PRINTER	750	3	0.12	8.1
	PROJECTOR	250	1	0.26	1.95
	ROTARY PUMP	740	1	0.13	2.886
	SCANNER	60	1	0.16	0.288
	WEIGHING MACHINE	20	3	0.16	0.288
	WEIGHING MACHINE	20	2	0.16	0.192
	WEIGHING MACHINE	20	2	0.16	0.192

CHEMISTRY RESEARCH LAB	FRIDGE	180	1	22	118.8
	MAGNETIC STIRRER	600	2	0.16	5.76
	MELTING POINT	150	1	0.16	0.72
	ROTARY EVAPORATOR	120	1	0.33	1.188
	TEMPRATURE	750	1	0.33	7.425
	UV CABINET	400	1	0.16	1.92
	UV DISINFECTION SYSTEM	400	1	0.16	1.92
	WAVE REFLECTOR	96	1	0.16	0.4608
COMM.ENG	PRINTER	750	1	0.11	2.475
COMMERCE	MODEM	20	1	3.33	1.998
	PRINTER	50	2	0.16	0.48
	PROJECTOR	250	1	0.66	4.95
COMMERCE(SF)	MODEM	20	1	3.33	1.998
	PRINTER	50	1	0.66	0.99
	PROJECTOR	250	1	1.33	9.975
COMPUTER LAB	PRINTER	20	6	0.33	1.188
CONFERENCE HALL	PURIFIER	500	1	3.33	49.95
CORRIDOR	COOLER	450	2	3.33	89.91
	COOLER	1000	1	3.33	99.9
	COOLER	600	1	3.33	59.94
	LAMP	60	2	0.66	2.376
DIGITAL LIBRARY	PRINTER/SCANNER	50	1	0.1	0.15
	PROJECTOR	270	1	0.14	1.134
	SWITCH -24 PORT	240	2	3.33	47.952
DINING AREA	FRIDGE	150	1	22	99
ECONOMICS	printer	750	1	1.6	36
	STABILIZER	50	1	3.33	4.995
	WIFI ROUTER	10	17	3.33	16.983
ENGLISH	PRINTER	50	1	0.33	0.495
	SCANNER	50	1	0.33	0.495
FIRST FLOOR	WATER COOLER	150	2	3.33	29.97
	MODEM	20	1	3.33	1.998
GROUND FLOOR	PRINTER	20	2	0.33	0.396
	PRINTER	50	2	0.33	0.99
HINDI	FRIDGE	750	1	22	495
KIOSK	FREEZER	150	1	22	99
LADIES HOSTEL	FRIDGE/ DEEP FREEZER	300	1	22	198
LIBRARY FIRST FLOOR	BARCODE SCANNER	25	1	0.1	0.075
	PRINTER	5	2	9	2.7
MAIN AUDITORIUM	DISCO LAMP	850	1	0.33	8.415
MATHEMATICS	MODEM	1000	6	3.33	599.4
	PRINTER	20	1	0.33	0.198
MCA	PROJECTOR	50	1	0.33	0.495
	SCANNER	250	1	0.33	2.475
	PRINTER	50	1	0.36	0.54

MCA (AUDITORIUM)	PRINTER	750	2	2.26	101.7
MCA BLOCK	PROJECTOR	250	3	1.56	35.1
MCA OFFICE	PROJECTOR	250	5	2.26	84.75
MCA VIP ROOM	PRINTER	400	1	0.66	7.92
MHRM	PRINTER	750	2	1.16	52.2
OFFICE	PRINTER	250	1	0.68	5.1
OFFICE ANNEX	PRINTER	750	3	1.66	112.05
PHYSICS	CRO	750	1	0.66	14.85
	CRO	50	4	2.41	14.46
	ELIMINATOR	4	4	3.33	1.5984
	FRIDGE	180	1	0.66	3.564
	FUME CUPBOARD	750	1	3.66	82.35
	MAGNETIC STIRRER	200	1	0.66	3.96
	MERCURY VAPOUR	400	1	0.66	7.92
	MERCURY VAPOUR	100	2	1.26	7.56
	mirror galvanometer	100	2	1.26	7.56
	printer	750	1	0.66	14.85
	SCANNER	750	2	1.26	56.7
	SIGNAL GENERATOR	75	1	0.66	1.485
	SODIUM VAPOUR	50	4	2.26	13.56
	SODIUM VAPOUR	150	1	0.66	2.97
	UV	150	1	0.66	2.97
	WEIGHING MACHINE	170	1	0.56	2.856
PRINCIPAL OFFICE	DVD	10	1	0.56	0.168
	FAX MACHINE	10	1	0.56	0.168
	PRINTER		1	0.66	0
PUNNAKOTTIL HALL	PROJECTOR	2	1	0.1	0.006
	WATER COOLER	300	1	0.1	0.9
SECOND FLOOR	MODEM		1	0.76	0
SEMINAR HALL	PROJECTOR	5	1	0.76	0.114
	PROJECTOR	250	1	0.76	5.7
STATISTICS	16 PORT SWITCH	250	1	0.76	5.7
	8 P0RT SWITCH	40	1	0.76	0.912
	MODEM	40	1	0.56	0.672
VICE PRINCIPAL OFFICE	ID CARD PRINTER	400	1	0.76	9.12
	SCANNER	750	1	0.76	17.1
VIP ROOM	PURIFIER	60	1	0.56	1.008
	WASHING MACHINE	500	1	0.56	8.4
ZOOLOGY	CENTRIFUGE	2000	1	0.57	34.2
	CENTRIFUGE	250	1	0.56	4.2
	CENTRIFUGE	250	1	0.55	4.125
	CONDUCTIVITY	250	1	0.76	5.7
	CXL MONO	250	1	0.76	5.7
	COLORIMETER	20	1	0.56	0.336
	COLORIMETER	50	3	1.66	7.47

	PH METER	10	1	0.56	0.168
	ELECTROPHORESIS POWER	50	1	0.56	0.84
	FRIDGE	200	2	1.66	19.92
	LAMINAR FLOW	750	1	1.62	36.45
	printer	250	1	1.66	12.45
	projector	400	1	1.66	19.92
	rotary shaker	250	1	1.66	12.45
	SCANNING MINISPEC	60	1	1.66	2.988
	SCANNER	50	1	1.66	2.49
	THERMOSTAT	750	1	1.66	37.35
	TRANSILLUMINATOR	140	1	1.66	6.972
	TOTAL ENERGY USAGE IN MONTH(kWh)				**4519.0**

Electricity saving methods adopted in the college

- ✓ Turn off electrical equipments when not in use
- ✓ Use energy efficient light-emitting diode (LED) bulbs instead of incandescent and CFL bulbs
- ✓ Maintain appliances and replace old appliances.
- ✓ Use computers and electronic equipments in power saving mode.
- ✓ Solar energy generation at a level of 100 kWh per day.

Waste Generation

- ❖ Total Stakeholders – 2903
- ❖ Class rooms – 83
- ❖ Staff rooms - 18
- ❖ Office rooms – 10
- ❖ Laboratories – 12
- ❖ Kitchen - 4
- ❖ E-wastes- computers, electrical and electronic parts – Disposal by selling
- ❖ Plastic waste- disposal by selling
- ❖ Solid wastes – Damaged furniture, paper waste, paper plates, food wastes – disposal by selling
- ❖ Chemical wastes – Laboratory waste – No treatment
- ❖ Waste water – washing, urinals, bathrooms in soak pits

- ❖ Glass waste – Broken glass wares from the labs to municipal waste collection centers.
- ❖ Earning from selling of waste – Rs. 10000/year
- ❖ Napkin incinerators -3

Quantity of waste generated:-

- ❖ Biodegradable – 8.5 kg/day (office and class rooms)
- ❖ Non biodegradable –2 kg/day " "
- ❖ Biodegradable – 2 kg/day (labs)
- ❖ Non-biodegradable – ½ kg/day (labs)
- ❖ Hazardous waste –110 gm/day (labs)
- ❖ E-waste collected – 128.2 Kg/year
- ❖ Unused equipments (Collected during the audit period)– 328 Kg
- ❖ Glass waste – 42 Kg/year
- ❖ Dry leaves – 84 Kg/day
- ❖ Napkins (number) – 205/day (burning by incinerators)

Canteen waste

- ❖ Biodegradable college canteen – 21 kg/day
- ❖ Non biodegradable – 2 kg/day

Waste treatment systems in place

Plastic shredding unit

Initiation of vermicomposting

Initiation of Bio gas plant

Canteen waste is used in piggery

Composting

Office and Class rooms

Approx	Bio degradable	Non-Bio	Hazardous	Others
< 1 kg.				
2-10 Kg	8.5kg/day	2kg/day	-	-

Laboratories

Approx	Bio degradable	Non-Bio	Hazardous	Others
< 1 kg.		500gm	110g/day	
2-10 Kg	2kg/day			

Canteen/kitchen

Approx	Bio degradable	Non-Bio	Hazardous	Others
< 1 kg.				
2-10 Kg		2kg/day		
	21kg/day			

Suggestion to Reduce Waste

a). Reduce the use of paper cups and plastic coated plates in canteen by introducing steel cups and plates
b) Implementing biogas plants in canteen

c) Green Campus

- Botanical Garden : 7 cent
- Herbal Garden : 25 cent
- Spices Garden : 20cent
- Biodiversity Garden(Santhisthal) : 10cent
- Medicinal Garden : 5 cent
- Vegetable garden : 50 cent
- Mushroom House :0.5 cent

Total number of plant species identified – 462
Tree cover of the campus - 96517.37 m^2
Free space in the campus – 82268.94 m^2
Garden area inside the college – 4532.48 m^2 (1.175 Acres)
Total campus area – 214483.68 m^2 (53 Acres)

CAMPUS FLORA

Sl.No	Name of plants	No. of plants
1	*Abelmoschus esculentus*	50
2	*Acacia mangium*	10
3	*Acacia pycnanth*	5
4	*Acalypha wilkesiana*	5
5	*Achras sapota*	3

6	*Acorus calamus*	2
7	*Adenanthera pavonica*	5
8	*Adhatoda vasica*	5
9	*Agave sp.*	5
10	*Aglaonema sp.*	10
11	*Agrostistachys indica*	1
12	*Ailanthus excelsa*	5
13	*Albizzia chinensis*	5
14	*Aleurites moluccana*	2
15	*Allamanda cathartica*	55
16	*Aloe vera*	5
17	*Alpinia galanga*	5
18	*Alpinia nutan*	5
19	*Alstonia scholaris*	3
20	*Alternanthera brasiliana*	40
21	*Amorphophallus paeoniifolius*	10
22	*Anacardium occidentale*	5
23	*Ananas comosus (Pineapple)*	100
24	*Annona muricata*	1
25	*Anthocephalus cadamba*	2
26	*Anthurium species*	20
27	*Antidesma acidum*	3
28	*Antigonon leptopus*	2
29	*Aphanamixis polystachya*	1
30	*Aporosa lindleyana*	1
31	*Arachis pintoi*	500
32	*Aralia sp.*	10
33	*Areca catechu*	46
34	*Areca palma*	10
35	*Aristolochia indica*	5
36	*Artabotrys hexapetalus*	1
37	*Artabotrys odoratissimus*	1
38	*Artocarpus heterophyllus*	30
39	*Artocarpus hirsuta*	125
40	*Artocarpus integrifolia*	10
41	*Asparagus racemosus*	2
42	*Azadirachta indica*	2
43	*Bacopa monieri*	50
44	*Balliospermum montanum*	2
45	*Bambusa glaucophylla*	2
46	*Bambusa sp.*	2
47	*Bauhina variegata*	2
48	*Bauhinia acuminate*	2

49	*Bauhinia tomentosa*	1
50	*Begonia sp.*	10
51	*Bignonia sp.*	2
52	*Blumea mollis*	10
53	*Bombax malabaricum*	
54	*Bougainvillea sp.*	50
55	*Brassica oleracea*	25
56	*Bridelia retusa*	2
57	*Brunfelsia calycinae*	1
58	*Cactus sp.*	2
59	*Caesalpinia coronaria- divi-divi*	2
60	*Caesalpinia pulcherrima*	3
61	*Calliandra rheedii*	2
62	*Callistemon lanceolatus*	1
63	*Calophyllum inophyllum- Punna*	1
64	*Cananga odorata*	2
65	*Canarium strictum*	1
66	*Canna indica*	15
67	*Capscicum annum*	10
68	*Capsicum frutescens*	15
69	*Carallia brachiata*	1
70	*Carica papaya*	15
71	*Cascabela thevetia*	1
72	*Cassia fistula*	13
73	*Casuarina equisetifolia*	5
74	*Centella asiatica*	28
75	*Chrysanthemum sp.*	5
76	*Chrysophyllum cainito*	2
77	*Cinnamomum verum –Lauraceae- Edana*	2
78	*Cinnamomum zeylanicum*	1
79	*Cissus quadrangularis*	1
80	*Citharexylum subserratum-paarijatham*	1
81	*Citrus limon*	3
82	*Clematis elliptica*	2
83	*Clerodendrum thomsoniae*	10
84	*Clitoria ternatea*	2
85	*Coccinea grandis*	2
86	*Cocos nucifera*	360
87	*Codium variegatum*	2
88	*Coffea arabica*	150
89	*Coleus aromaticus*	5
90	*Colocasia esculenta*	25
91	*Coriandrum sativum*	5

92	*Costus spictus*	5
93	*Couroupita guianensis*	1
94	*Crossandra infundibuliformis*	1
95	*Croton sp.*	25
96	*Cuphea minuta*	10
97	*Curcuma longa*	2
98	*Cuscuta reflexa*	2
99	*Cycas circinalis*	1
100	*Cycas revoluta*	1
101	*Cymbopogon citratus*	2
102	*Cyrtostachys renda- Red palm*	5
103	*Dalbergia latifolia*	1
104	*Dalbergia sisso*	1
105	*Datura metel*	1
106	*Delonix regia*	1
107	*Derris trifoliata*	1
108	*Dieffenbachia sanguine*	15
109	*Dillenia bracteolate*	1
110	*Dillenia indica*	1
111	*Dioscorea esculenta*	5
112	*Diospyros blancoi- velvet apple*	1
113	*Diospyros peregrine*	1
114	*Dracaena braunii*	5
115	*Dracaena fragrans*	2
116	*Dracaena sp.*	5
117	*Duranta plumieri*	2
118	*Duranta repens*	2
119	*Elettaria cardamomum*	10
120	*Emblicaofficinalis*	2
121	*Ervatamia coronaria*	1
122	*Erythrina indica*	1
123	*Erythroxylum monogynum-*	
124	*Eugenia jambos*	3
125	*Euodia lunu-ankenda*	1
126	*Euphorbia hirta*	50
127	*Euphorbia rothieri*	5
128	*Euphorbia sp.*	5
129	*Evodia lunuankenda*	2
130	*Evodia roxburghiana*	1
131	*Exoecaria bicolor-*	1
132	*Felicium decipiens*	1
133	*Ficus asperrima*	2
134	*Ficus auriculata*	1

135	*Ficus bengalensis*	2
136	*Ficus benjamina*	1
137	*Ficus elastic*	4
138	*Ficus hispida*	10
139	*Ficus racemosa*	1
140	*Ficus religiosa*	2
141	*Filicium decipiens*	1
142	*Flacourtia montana*	1
143	*Garcinia gummi-gutta*	2
144	*Garcinia mangostana*	1
145	*Gardenia gummifera*	3
146	*Gardenia jasminoides*	5
147	*Gliricidia maculata*	1
148	*Glycosmis pentaphylla*	5
149	*Hamelia patens*	1
150	*Helicteres isora*	2
151	*Hevea brasiliensis*	200
152	*Hibiscus rosa-sinensis*	15
153	*Holmskioldia sanguinea*	1
154	*Holoptelea integrifolia*	2
155	*Holorrhena antidysenterica*	1
156	*Hopea parviflora*	2
157	*Humboldtia brunonis*	1
158	*Hylocereus undatus*	1
159	*Hypoestes phyllostachya*	1
160	*Impatiens balsamina*	10
161	*Indigofera sp.*	1
162	*Ixora chinensis*	5
163	*Ixora coccinea*	5
164	*Ixora philippinensis*	2
165	*Jasminum angustifolium*	1
166	*Jasminum grandiflorum*	5
167	*Jasminum rigidum*	2
168	*Justicia beddomei*	25
169	*Justicia gendarussa*	15
170	*Kaempferia galangal*	2
171	*Kleinhovia hospita*	2
172	*Kopsia fruticose*	1
173	*Lagerstroemia flos reginae*	2
174	*Lagerstroemia microcarpa*	1
175	*Lannea coromandelica*	1
176	*Lantana camara*	25
177	*Lawsonia inermis*	2

178	*Lepisanthes teraphylla*	1
179	*Lycopersicum esculentum*	25
180	*Macaranga peltata*	1
181	*Madhuca neriifolia*	1
182	*Mangifera indica*	40
183	*Manihot esculenta*	25
184	*Manilkara zapota*	2
185	*Marsilea quadrifolia*	5
186	*Meiogyne panosa*	2
187	*Melastoma malabathricum*	10
188	*Mentha piperita*	2
189	*Mesua thwaitesii*	1
190	*Michelia champaca*	2
191	*Millingtonia hortensis*	2
192	*Mimusops elengi*	31
193	*Momordica charantia*	2
194	*Moringa oleifera*	5
195	*Morua alba*	5
196	*Murraya exotica*	5
197	*Murraya koenigii*	2
198	*Musa paradisiacal*	200
199	*Mussaenda erythrophylla*	5
200	*Mussaenda frondosa*	2
201	*Myristica fragrans*	12
202	*Naregamia alata*	5
203	*Nelumbium speciosum*	2
204	*Nephelium lappaceum*	11
205	*Nephelium mutabile*	2
206	*Nerium indicum*	10
207	*Nymphaea pubescens*	5
208	*Ochna obtusata*	
209	*Ocimum basilicum*	10
210	*Olea dioica*	
211	*Olea dioica- Karivetti*	1
212	*Oroxylum indicum*	
213	*Oscimum sanctum*	10
214	*Osmoxylon lineare*	10
215	*Oxalis purpurea*	50
216	*Pachystachys lutea*	5
217	*Palm sp.*	2
218	*Pandanus odoratissimus*	2
219	*Passiflora miniata*	2
220	*Passiflora sp*	5

221	*Pedilanthus tithymaloides*	10
222	*Peltophorum ferrugineum*	35
223	*Peltophorum pterocarpum*	10
224	*Peltophorum roxburghii*	10
225	*Phaseolus vulgaris*	5
226	*Pholidota imbricata*	1
227	*Pimenta dioica*	2
228	*Piper longum*	5
229	*Pipper nigrum*	5
230	*Pithecellobium saman*	2
231	*Plinia cauliflora*	1
232	*Plumbago indica*	5
233	*Plumbago zeylanicus*	2
234	*Plumeria acutifolia*	4
235	*Plumeria indica*	5
236	*Poeciloneuron indicum*	1
237	*Poinsettia pulcherrima*	2
238	*Polyalthia longifolia*	5
239	*Poncirus trifoliata*	2
240	*Pongamia glabra*	5
241	*Pongamia pinnata*	2
242	*Pouteria campechiana*	1
243	*Psidium guajava*	15
244	*Punica granatum*	1
245	*Quisqualis indica*	2
246	*Rauvolfia serpentina*	2
247	*Rhoeo discolor*	10
248	*Ricinus communis*	2
249	*Rivina humilis*	5
250	*Rosa sp.*	5
251	*Roystonea regia*	10
252	*Salacia fruticosa*	2
253	*Salvia officinalis*	5
254	*Sanseviera sp.*	10
255	*Saraca india*	2
256	*Sauropus quadrangularis*	5
257	*Schefflera arboricola*	10
258	*Schleichera oleosa*	2
259	*Simarauba glauca*	2
260	*Solanum melongena*	5
261	*Spathodea campanulata*	2
262	*Spathoglottis sp*	10
263	*Spathyphyllum*	3

264	*Spondias indica*	2
265	*Stereospermum suaveolens*	1
266	*Sterospermum colais*	2
267	*Strelitzia reginae*	1
268	*Strobilanthus ciliates*	15
269	*Strychnos nux-vomica*	1
270	*Sweitenia mahagoni*	100
271	*Symplocos cochinchinensis*	2
272	*Syncepalum dulcificum*	1
273	*Syngonium podophyllum*	50
274	*Syzygium aqueum*	1
275	*Syzygium aromaticum*	1
276	*Syzygium cumini*	8
277	*Syzygium malaccense*	1
278	*Syzygium zeylanicum*	1
279	*Tabernaemontana dichotoma*	5
280	*Tamarindus indica*	7
281	*Tecoma stans*	2
282	*Tectona grandis*	15
283	*Terminalia arjuna*	2
284	*Terminalia bellirica*	2
285	*Terminalia catappa*	10
286	*Terminalia paniculata*	5
287	*Theobroma cocoa*	5
288	*Thevetia peruviana*	2
289	*Thottea siliquosa*	3
290	*Thuja sp.*	2
291	*Thunbergia erecta*	5
292	*Thunbergia laurifolia*	1
293	*Thymus vulgaris*	10
294	*Trema orientalis*	2
295	*Trichosanthes cucumerina*	2
296	*Uvaria narum*	2
297	*Vanilla planifolia*	5
298	*Vateria indica*	1
299	*Vigna radiata*	25
300	*Vinca rosea*	50
301	*Woodfordia fruiticosa*	2
302	*Zingiber officinale*	10

BOTANICAL GARDEN

Sl.No	Name of Plants	No. of Plants
1	*Adenanthera pavonica*	1
2	*Adhatoda vasica*	3

3	*Aglaonema sp.*	10
4	*Allamanda cathartica*	5
5	*Anthurium species*	5
6	*Arachis pintoi*	many
7	*Aralia sp.*	5
8	*Asparagus racemosus*	1
9	*Bambusa glaucophylla*	1
10	*Bauhinia tomentosa*	2
11	*Bauhinia variegata*	1
12	*Begonia sp.*	2
13	*Bougainvillea sp.*	10
14	*Cactus sp.*	5
15	*Callistemon lanceolatus*	1
16	*Canna indica*	5
17	*Clematis elliptica*	2
18	*Clitoria ternatea*	2
19	*Cocos nucifera*	5
20	*Costus sp.*	7
21	*Costus spictus*	2
22	*Crossandra infundibuliformis*	1
23	*Croton sp.*	11
24	*Cuphea minuta*	7
25	*Cycas circinalis*	1
26	*Datura metel*	1
27	*Dieffenbachia sanguine*	1
28	*Dracaena braunii*	2
29	*Dracaena fragrans*	3
30	*Duranta plumieri*	1
31	*Duranta repens*	2
32	*Ervatamia coronaria*	2
33	*Poinsettia pulcherrima*	1
34	*Gardenia gummifera*	3
35	*Gardenia jasminoides*	2
36	*Hamelia patens*	1
37	*Hibiscus rosa-sinensis*	3
38	*Holmskioldia sanguinea*	1
39	*Hypoestes phyllostachya*	3
40	*Ixora chinensis*	2
41	*Ixora philippinensis*	1
42	*Jasminum grandiflorum*	1
43	*Kopsia fruticosa*	1
44	*Lantana camara*	10
45	*Melastoma malabathricum*	5
46	*Murraya exotica*	2
47	*Nelumbium speciosum*	3

48	*Nerium indicum*	2
49	*Nymphaea pubescens*	2
50	*Osmoxylon lineare*	6
51	*Pachystachyslutea*	4
52	*Pandanus odoratissimus*	2
53	*Passiflora sp*	1
54	*Piper longum*	2
55	*Piper nigrum*	3
56	*Plumeria indica*	1
57	*Quisqualis indica*	2
58	*Rivina humilis*	4
59	*Rosa sp.*	2
60	*Salvia officinalis*	2
61	*Sansivieria sp.*	5
62	*Schefflera arboricola*	3
63	*Thevetia peruviana*	1
64	*Thuja sp.*	3
65	*Thunbergia laurifolia*	2
66	*Uvaria narum*	1
67	*Woodfordia fruiticosa*	1

MEDICINAL PLANTS

Sl.No	Name of Plants	No. of Plants
1.	*Achyranthes aspera*	2
2.	*Adenanthera pavonina*	5
3.	*Adhatoda vasica*	1
4.	*Aerva lanata*	6
5.	*Aloe vera*	5
6.	*Alpinia calcrata*	6
7.	*Alpinia galanga*	3
8.	*Alstonia scholaris*	4
9.	*Andrographis panicullata*	2
10.	*Anisomalous asiatica*	6
11.	*Asparagus racemosus*	2
12.	*Azadirachta indica*	3
13.	*Bacopa monieri*	4
14.	*Biophytum sesitivum*	3
15.	*Boerhavia diffusa*	5
16.	*Butea monosperma*	2
17.	*Calotropis gigantia*	2
18.	*Cardiospermum helicacabum*	5
19.	*Careya arborea*	8
20.	*Cassia fistula*	4
21.	*Cassia occidentalis*	2
22.	*Catharanthus roseus*	3

23.	*Centella asiatica*	6
24.	*Chasalia curviflora*	3
25.	*Cinnamomum zeylanicum*	6
26.	*Clerodendron viscosum*	3
27.	*Clitoria ternatea*	5
28.	*Coffea arabica*	2
29.	*Coriandrum sativum*	3
30.	*Costus spictus*	4
31.	*Curcuma longa*	1
32.	*Cycas circinalis*	2
33.	*Datura metel*	3
34.	*Datura stramonium*	5
35.	*Diospyros sp.*	4
36.	*Duranta plumieri*	5
37.	*Eclipta alba*	2
38.	*Elephantopus scaber*	2
39.	*Elettaria cardamomum*	3
40.	*Emblica officinalis*	2
41.	*Emelia sonchifolia*	3
42.	*Euphorbia hirta*	2
43.	*Evolvulus alsinoides*	2
44.	*Ficus benghalensis*	4
45.	*Ficus microcarpa*	4
46.	*Ficus racemosa*	3
47.	*Ficus religosa*	2
48.	*Garcinia cambogia*	5
49.	*Heliotropium indicum*	2
50.	*Hemidesmus indicus*	1
51.	*Hibiscus rosa-sinensis*	3
52.	*Holoptelia integrifolia*	6
53.	*Holorrhena antidysenterica*	4
54.	*Hopea parviflora*	8
55.	*Ipomoea sepiaria*	3
56.	*Ixora coccinea*	6
57.	*Kaempferia galangal*	5
58.	*Lannea coromandelica*	4
59.	*Leucas aspera*	2
60.	*Mimosa pudica*	3
61.	*Murraya koenijii*	2
62.	*Myristica fragrans*	5
63.	*Nelumbium speciosum*	3
64.	*Ocimum basailicum*	5
65.	*Ocimum sanctum*	4

66.	*Oxalis corniculata*	2
67.	*Phyllanthus neruri*	3
68.	*Pimenta dioica*	6
69.	*Piper longum*	5
70.	*Plumbago rosea*	2
71.	*Pongamia pinnata*	3
72.	*Psidium guajava*	4
73.	*Rauvolfia serpentina*	2
74.	*Rosa indica*	3
75.	*Sansivieria roxburghiana*	1
76.	*Saraca indica*	3
77.	*Scoparia dulcis*	1
78.	*Strobilantus ciliatus*	2
79.	*Strychnos nuxvomica*	3
80.	*Syzygium aromaticum*	2
81.	*Terminalia catappa*	5
82.	*Tinospora cordifolia*	6
83.	*Tragia involucrata*	4
84.	*Tridax proccumbens*	2
85.	*Vatteria indica*	3
86.	*Vernonia cineria*	5
87.	*Vitex negundo*	2
88.	*Zingiber officinale*	2

VEGETABLES CULTIVATED

Sl. No.	Name of plants	No. of plants
1.	*Abelmoschus esculentus – ladies finger*	10
2.	*Amaranthus spp – cheera*	5
3.	*Amorphophallus paeoniifolius – chena*	14
4.	*Benicasa hispoida – kumblanga*	5
5.	*Brassica oleracea var.boatrytis – cauliflower*	15
6.	*Brassica oleracea var.capitata– cabbage*	30
7.	*Capcicum annum – chilly*	32
8.	*Carica papaya – papaya*	7
9.	*Coccinia grandid – koval*	8
10.	*Colocasia esculenta – chembu*	25
11.	*Cucumis sativus – cucumber*	12
12.	*Cucurbita mellonia – pumkin*	8
13.	*Curcuma longa – turmeric*	25
14.	*Dioscorea alalta – kachil*	10
15.	*Diosscorea esculenta – cheru kirange*	9
16.	*Lagenaria siceraria – bottle gourd*	10

17.	*Lycopersican esculentum – tomato*	13
18.	*Manihot esculenta – tapioca*	50
19.	*Momordica charantia – bitter god*	10
20.	*Moringa oleifera – drum stick*	3

SPICES GARDEN

Sl. No.	Name of plants	No. of plants
1	*Elettaria cardamomum*	3
2	*Zingiber officinale*	5
3	*Curcuma longa*	8
4	*Cinnamomum zeylanicum*	1
5	*Punica granatum*	1
6	*Piper longum*	1
7	*Piper nigrum*	12
8	*Pimenta dioica*	2
9	*Garcinia cambogia*	1
10	*Myristica fragrans*	1
11	*Tamarindus indica*	2
12	*Nephelium mutabile*	1
13	*Garcinia mangostana*	2
14	*Achras sapota*	1
15	*Annona muricata*	1
16	*Syzygium samarangense*	1
17	*Mangifera indica*	3
18	*Psidium guajava*	1
19	*Simarouba glauca*	1
20	*Nephelium lappaceum*	1
21	*Cycas circinalis*	2
22	*Capsicum annuum*	8

ORNAMENTAL PLANTS

Sl.no	Name of plants	No. of plants
1.	*Alstonia scholaris*	3
2.	*Bauhinia acuminate*	2
3.	*Biophytum sensitivum*	5
4.	*Calendula officianalis*	3
5.	*Cassia fistula*	6
6.	*Cesalpinia pulcherrima*	2
7.	*Clitoria ternatea*	5
8.	*Crosandra infundibuliformis*	3
9.	*Delonix rejia*	4
10.	*Hibiscus rosasinesis*	5
11.	*Ixora coccinia*	3
12.	*Jasminum grandiflorum*	2

13.	*Jasminum officinale*	2
14.	*Maranta leuconeura*	5
15.	*Michelia chempaca*	2
16.	*Mimosa pidica*	8
17.	*Mirabilis jalapa*	2
18.	*Nelumbo nucifera*	3
19.	*Nerium indicum*	6
20.	*Nymphaea nouchali*	2
21.	*Ocimum sanctum*	3
22.	*Quisqualis indica*	4
23.	*Saraca indica*	2
24.	*Tabernaemontana divericata*	5
25.	*Vinca rosea – savam nari*	2
26.	Sansevieria trifasciata – snake plant	4
27.	Rhoeo spathacea – tricolor rhoeo	2
28.	Syngonium podophyllum – arrow head plant	3
29.	Begonia spp.	8
30.	Dracaena spp.	8
31.	Canna indicum	7
32.	Alamanda catharitica – kolambi	5
33.	Spathiphyllum wallisii	6
34.	Agave americana – agave	3

FRUIT YIELDING PLANTS

Sl. No.	Name of plants	No. of plants
1	*Ananus comosus*	5
2	*Annona muricata*	4
3	*Annona squamosa*	3
4	*Artocarpus integrifolia*	8
5	*Artocarpus hirsutus*	5
6	*Citrus limon*	4
7	*Garcinia mangostana*	3
8	*Hylocereus undatus*	2
9	*Mangifera indica*	3
10	*Morus alba*	2
11	*Musa paradisicum*	1
12	*Nephelium lappaceum*	2
13	*Nephelium mutabile*	1
14	*Passiflora edulis*	2
15	*Phyllanthus emblica*	4
16	*Psidium guava*	5
17	*Punica granatum*	6

18	*Spondias mombin*	2
19	*Syzygium jambos*	3
20	*Syzygium samarangense*	4
21	*Tamarindus indica*	2

GYMNOSPERMS

Sl. No.	Name of plants	No. of plants
1	*Cycas circinalis*	3
2	*Cycas revoluta*	2
3	*Podocarpus gracilior*	1
4	*Zamia sp.*	1

PTERIDOPHYTES

Sl. No.	Name of plants	No. of plants
1	*Adiantum*	5
2	*Angiopteris*	4
3	*Asplenium*	5
4	*Azolla*	3
5	*Cheilanthes*	4
6	*Cyclosorus*	6
7	*Dicranopteris*	3
8	*Drymoglossum*	5
9	*Drynaria*	6
10	*Equisetum*	4
11	*Lycopodium*	4
12	*Lygodium*	3
13	*Marsilea*	4
14	*Microlepia*	6
15	*Nephrolepis*	5
16	*Parahemionitis*	5
17	*Pityrogramma*	6
18	*Psilotum*	3
19	*Pteridium*	4
20	*Pteris*	8
21	*Pyrrosia*	6
22	*Salvinia*	3
23	*Selaginella*	5
24	*Tectaria*	4

PLANTS CULTIVATED BY STUDENTS

Sl. No	Name	No. of plants
1	*Abelmoschus esculentus*	5
2	*Achras sapota*	7

3	*Amaranthus sp.*	5
4	*Amorphophallus paeoniifolius*	6
5	*Ananus comosus*	2
6	*Annona muricata*	2
7	*Annona squamosa*	3
8	*Artocarpus hirsutus*	8
9	*Artocarpus integrifolia*	10
10	*Benicasa hispoida*	6
11	*Capcicum annum*	5
12	*Carica papaya*	12
13	*Cinnamomum zeylanicum*	4
14	*Citrus limon*	5
15	*Colocasia esculenta*	6
16	*Cucumis sativus*	4
17	*Curcuma longa*	3
18	*Cycas circinalis*	3
19	*Elettaria cardamomum*	2
20	*Garcinia cambogia*	6
21	*Garcinia mangostana*	3
22	*Hylocereus undatus*	8
23	*Lycopersican esculentum*	3
24	*Mangifera indica*	12
25	*Manihot esculenta*	5
26	*Momordica charantia*	2
27	*Musa paradisicum*	4
28	*Myristica fragrans*	3
29	*Nephelium lappaceum*	4
30	*Nephelium mutabile*	2
31	*Passiflora edulis*	5
32	*Phyllanthus emblica*	4
33	*Pimenta dioica*	5
34	*Piper longum*	5
35	*Piper nigrum*	4
36	*Psidium guajava*	5
37	*Psidium guava*	2
38	*Punica granatum*	3
39	*Simarouba glauca*	4
40	*Solanum melongena*	5
41	*Spondias mombin*	2
42	*Syzygium jambos*	2
43	*Syzygium samarangense*	3
44	*Tamarindus indica*	8
45	*Zingiber officinale*	4

STAR PLANTS Garden

Sl No	Zodiac Sign	Name of Plant
1	Aswathy	*Strychnos nux-vomica*
2	Bharani	*Phyllanthus emblica*
3	Karthika	*Ficus glomerata*
4	Rohini	*Syzygium cuminii*
5	Makayiram	*Acacia catechu*
6	Thiruvathira	*Diospyros cambodiana*
7	Punartham	*Bamboosa arundinaceae*
8	Pooyam	*Ficus religiosa*
9	Aayilyam	*Mesua ferrea*
10	Makam	*Ficus benghalensis*
11	Pooram	*Butea frondosa*
12	Uthram	*Ficus tinctoria*
13	Atham	*Spondias pinnata*
14	Chithira	*Aegle marmelos*
15	Chothy	*Terminalia arjuna*
16	Visakham	*Garuga pinnata*
17	Anizham	*Mimusops elengi*
18	Thrikketta	*Aporusa lindleyana*
19	Moolam	*Pinus excelsa*
20	Pooradam	*Salix tetraspeama*
21	Uthradam	*Artocarpus heterophyllus*
22	Thiruvonam	*Calotropis gigantea*
23	Avittam	*Prosopis juliflora*
24	Chathayam	*Anthocephalus cadambu*
25	Pooruruttathi	*Mangifera indica*
26	Uthruttathi	*Borassus flabellifer*
27	Revathi	*Madhuca longifolia*

Nature awareness programmes in the campus

- 2016-2017 organic farming
- 2016-2017 Paddy cultivation
- Bio diversity club
- Engaging students in maintaining spices garden
- Engaging students in maintaining herbal garden and medicinal garden.
- Mushroom cultivation workshop.
- Apiculture workshop
- Flower arrangements workshop
- Plastic free campaign
- Workshop on eco-friendly carry bags
- Nature camps, field trips and

- Maintaining of shanthistal
- Participation of teachers in national green crops
- Initiation of vermicompost.
- Initiation of bio gas plant.
- Initiation of wick irrigation for grow bag cultivation.
- Invited talks on environment sustainability
- Switching from flex to cloth banners

Eco Friendly Activities During 2016-17

Sl.No.	Name of the activity	Organising unit/ agency/ collaborating agency
1.	Mushroom cultivation and sale of the organic produce	Dept.of Botany
2.	A Restoration Programme of Santhukad SreeDurga Bhadra Naga temple Sacred grove, Near Thodupuzha, Kerala	Temple Authorities, SanthukadSreeDurgaBhadra Naga temple; Dept. of Zoology
3.	Farmer's day celebration in adopted village, Avoly	GramaPanchayat, Avoly; NSS Unit Nirmala College
4.	Organic farming- planted 80 plantain seedlings and sale of the organic produce	KrishiBhavan, Avoly; NSS Unit Nirmala College
5.	Exhibition on awareness about plastic: Reduce, Reuse and Recycle	NSS Unit Nirmala College
6.	SuchitwaBodhanaYajnam- Padayathra (Walkathon)	Rajagiri College of Social Sciences, Kalamassery; NSS Unit Nirmala College
7.	AnikaduWaterbody Conservation Project	Green People, an Environmental Organization, Residents Associations and Avoly GramaPanchayat; NSS Unit Nirmala College
8.	Paddy cultivation in 60 cents of land and sale of the organic produce.	KrishiBhavan, Avoly; NSS Unit Nirmala College

Routine Green Practices

- **World Environment Day – June 5**

  Awareness seminars are organized on various environmental problems. Planting trees, poster exhibition etc. are some activities on that day.

- **Ozone Day – September 16**

  Invited lectures, Painting competitions

Activities of Nature club

The nature club conducts a number of programmes to promote love of nature among students and make them conscious of the various ways in which they can work effectively to preserve the ecosystem. The programmes include nature camps, environment education, wildlife surveys, mountaineering etc. As part of this club students are encouraged to plant saplings of rare and endangered plants to conserve biodiversity. Students are motivated to keep up the green cover maintenance by planting various medicinal, ornamental, spices and vegetable plants in the campus.

Suggestions to Improve Green Cover in the campus

- Bush gardens
- Terrace cultivation of vegetables
- Green corridors
- Canopy climbers through walkways
- Plantation of trees

d) Carbon Footprint

Transportation means of stakeholders

Stakeholders	Bus	Bike	Car	Autorik shaw	Cycle	pedest rians	Total
Staffs	74	38	58	9	-	22	201
Students	2069	170	7	-	1	455	2702
Visitors	24	3	nil	nil	-	4	31

- Number of persons using cycles – 1
- Number of persons using cars – 65
- Number of persons uses two wheelers – 208
- Number of persons uses autorikshaw – 9/day
- Number of persons using other transportations – 2620
- Number of visitors per day – 31
- Number of Students staying in the hostel – 410

- Number of Faculty and staff staying in the quarters – 10
- Auto charges for office transportation – 6000/month
- Average distance travelled by stake holders – 28 kms/day
- Expenditure for transportation per person per day – Rs.25/-

Suggestions to reduce carbon footprint

(i) College observe " no own vehicle day" every month. The second Tuesday of every month is dedicated for it. Teachers and students are not allowed to take their private vehicles on that day and are supposed to reach college via public transportation methods. The no own vehicle day is widely accepted among students and teachers and is hugely appreciated by the community.

(ii) College also promote car and bike pooling system. Teachers/ students coming from the same area share their vehicles to reach the college. This also reduces the number of private vehicles used in the college campus.

4.2 Evaluation of Audit Findings

Water

Water Audit at Nirmala College, Muvattupuzha					
1	2	3	4	5	6
Activity	Average use per activity (litres)	Number of activity /day	water use/ person / day (litres)	Number of persons using water	Total water consumption / day (litres)
Washing hands and face	1/2L	2 times a day	1L	1300	1300
Bath	10-30	once	20L	500	11000
Toilet flush	6-20	once	10L	2000	19400
Leaking/dripping tap (1 drop/ second /day)	30-60	continuous	21 taps		727
garden use	4	once			5000

Cooking (average)	3	once	3		5000
Hostel uses	All uses	Twice	410	2	33000
Lab uses	3	once	3L		12300
Construction work					5000
Total water use					**92727 L/day**

92727 liters of water is used per day by the college for its different uses. The main source of water is ground water. Water from the public water supply is not utilized. **727 L** of water is lost per day through the leaking of pipes and other misuse. This can be prevented. If water treatment system is installed at canteen and chemical laboratories the amount of water lost through outlets can be recycled and utilized for gardening and toilet uses. Awareness programs for the management of sustainable water use will be highly beneficial in this college.

Energy

Energy Utilization

Appliances	Number of appliance	Units of current per
Computers and laptops	327	3507.20
Air conditioners	25	1413.60
CFL bulbs	432	538.96
Photocopiers	6	142.56
LED lights	118	35.29
Incandescent bulbs	39	101.36
Fans	814	2618.99
Tube lights	656	729.20
Electrical Equipments	217	4519.00
Televisions	21	13.33
Inverters	60	591.63
Heaters	30	336.18
CCTV DVR	21	368.67
Water pumps	5	2941.00
Total Energy usage per month (kWh)		**17856.97**

The total energy utilization of the college for different purposes is approximately **17856.97 units/month**. Increased production of solar energy a type of non-conventional category of energy will be a good energy management system for

the college. Electricity charges per month are **Rs.100000/month**. Energy saving through the replacement of incandescent bulbs, CFL lamps and tube lights to LED light could be a good option. Energy efficient electrical equipments especially fans and pump sets can be replaced against old ones. Awareness programs for the stakeholders to save energy may also increase sustainability in the utilization of various energy source.

Waste

- Total Biodegradable waste = 115.5 kg/day
- Non-biodegradable waste = 4 ½ kg/day
- Hazardous wastes = 110 grams/day

The composting facility of the college for the treatment of biodegradable waste generated from the canteen, office, vegetable garden, and from the college campus cleaning operations is not adequate. Different methods such as pit composting, vermicomposting, bacterial composting using bacterial consortium may be used to treat the biodegradable waste. Bottles, plastics, cans, broken glass wares, tins etc., may be recycled or sold out. A model solid waste treatment system can be established in the college as a part of awareness program to the students.

Green Campus

Total campus area – 53 Acre (214483.05 m^2

Total number of plant species identified – 462

Tree cover of the campus – 96517 m^2

Garden area inside the college – 4734.85 m^2

Free space available in the campus – 82065 m^2

Total area for cultivation:-

Veg. garden area - 50 cents

Medicinal plant garden – 5 cents

Spices garden – 20 Cents

Herbal garden – 25 Cents

Biodiversity garden – 10 Cent

The college has ample land surface for greening initiatives. The campus has 31 species of trees. A model arboretum will be ideal for the college. At least 50 different types of trees can be planted in the campus every year. Area demarcated for the establishment of a gardens of medicinal plants, paddy field and vegetable garden, may be extended.

Carbon Footprint

- Petrol used by two wheelers/day–**208 L**
  (Per person to and fro 42 kms =1L)
- Fuel used by four wheelers (65 Persons) - **130 L**
  (Per person to and fro 42 kms = 2L)
- Fuel for persons (total 2620 persons) travelling by common transportation = **210 L** (4L x 50 persons)
- Persons travelling autorickshaw – 9 / day (Cost Rs. 450/day)
- Fuel used – 4 ½ L (½ /person)

Total fossil fuel use is 552 ½ L / day

Total fuel cost per day for transportation = Rs 36070/day

(548 L x Rs 65)

- Cost of Gas cylinders used Rs. 39000/month (60 cylinders)
- Cost of generator fuel – Rs. 750/day
- Amount spent for transportation (office) – Rs. 6000/month (Approx.)
- Amount spent for transportation (canteen) – Rs. 4000/month "
- Amount spent for transportation (visitors) – Rs. 15000/year
- Other expenditures for the fuel – Rs. 375/day

Burning of fossil fuels is the main source and cause of carbon dioxide release to the atmosphere. Carbon dioxide release for the stakeholders to reach the college is very high. It is contributing to the global warming and increasing the pace of climate change. If a College bus is plying for the staff and students carbon dioxide released for the stakeholders' commutation can be reduced.

More trees may be planted in the campus to make a source of sink for the carbon dioxide and other green house gases.

4.3 Consolidation of Audit Findings

We hope that students will have developed a greater appreciation and understanding of the impact of their actions on the environment. They have successfully been able to determine the impacts on the environment through the various auditing exercises. Participating in this green auditing procedure they have gained knowledge about the need of sustainability of the college campus. It will create awareness on the use of the Earth's resources in their home, college, local community and beyond.

Major Audit Observations

Approximately 95000L water is pumped to the overhead tanks from 5 wells with the help of 5 pumps (total 30 hp) every day. Frequency of water pumping will be more during the summer months. This may lead to ground water depletion and induce drought to the locality. Usage of water should be cut short and water management should be done for the replenishment of ground water resources. Power consumption in the college is high even though there is solar power generation at the rate of 3000 kWh/month. Cost of energy including electricity, fuel for generator, firewood etc is up to 171100/month. It is high time to go for more non conventional type of energy sources. College generates 115.5 kgs of biodegradable waste which is good for bio gas production. Composting using consortium of bacteria may also be used to manage waste in the campus. If different model plants of solid waste treatment are established in the college, which will be a source of informal education for students to practice the waste treatment at home there by a menace of the society can be partially controlled. College has 462 species of plants in the campus, but an inventory of all plants present with photographs are lacking. There is enough free space to plant fruit trees in the campus. It is high time to make an arboretum in the campus.

Carbon emission rate in the college is very high. 552.5 liters of fossil fuels are burned every day by the stakeholders for their transportation alone. 60 LPG cylinders are used in the college for different purposes. This is also contributing to the carbon footprint. College management should think loudly to reduce the carbon emission rate at the earliest.

- The environmental awareness initiatives are not substantial.
- The installation of solar panels, training in vegetable cultivation and composting practices are inadequate.
- There is no Green policy/ environmental policy statement indicating the commitment of the college towards its environmental performance.
- Gardens inside the college premises are found well maintained.
- Use of notice boards and signs are inadequate to reduce over exploitation of natural resources.
- Programs on green initiatives have to be increased. Campus is declared plastic free; stringent actions should be taken to maintain this.
- Rain water harvesting systems, solar power generation, and environmental education programs have to be strengthened.

Water Audit

- There is no water consumption monitoring system in the college campus.
- The college does not have waste water treatment for waste water generated from laboratories, canteen, hostel kitchen, toilets, bathrooms and office rooms.
- The waste water from laboratories, canteen and kitchens are not suitably controlled and are not used for gardening.
- The college has to take actions to strengthen rain water harvesting. Rain water harvesting for separate buildings are lacking. Measurement of quantity of water obtained from the rain water harvesting should be done.

- Automatic switching system is not installed for pump sets used for overhead tank filling.
- Per day use of water is very high and there is no control over wastage of water.
- Display boards against the misuse of water use are lacking.

Energy Audit

- The communication process for awareness in relation to energy conservation is found inadequate.
- Assessment of electrical load calculation is yet to be done by the college.
- Monthly use of electricity in the college is very high.
- Objectives for reducing energy, water and fuel consumption are meager.
- There are fans of older generation and non energy efficient which can be phased out by replacing with new energy efficient fans.
- Regular monitoring of equipments and immediate rectification of any problems.

Waste Management Audit

- Solid waste management systems established are insufficient.
- The college has proper communication with the local body for regular collection of solid waste from the campus.
- Implementation of sustainable projects to attain set environmental goals is not in place.
- Waste bins in the class rooms, veranda, canteen and campus are inadequate.
- Bio gas plant is not working.
- Proper composting systems are lacking.
- Green chemistry labs are not introduced.

Green Campus Audit

- Regular planting of trees in the campus are inadequate.
- Display boards to all plants identified are lacking.
- No arboretum is set up in the college campus.
- There is only very few fruit trees in the college to attract birds.
- Registry for flora and fauna on the campus is lacking.
- Uses of herbals cultivated in the medicinal plant garden are not displayed.

Carbon Foot Print Audit

- College has not yet taken any initiative for carbon accounting.
- Adequate common transportation facilities should be provided by the college.
- Encourage students to use cycles.
- **552.5** liters of fossil fuel is burned every day for the functioning of the college. This releases very high carbon emission.
- A huge amount such as **Rs. 36070** per day is spent as the cost of fossil fuel by the stakeholders.
- Usage of **60** gas cylinders per month is very high. Rs.1300 is spent for LPG every month. Stakeholders spent Rs 375/day for other expenses for the energy.

4.4 Preparation of Action Plan

Policies referring to college's management and approach's towards the use of resources need to be considered. The college should have a green policy/environmental policy for its sustainable development. The environmental policy formulated by the management of the college should be implemented meticulously. The college should have a policy on awareness raising or training programs (for ground staff or kitchen staff for example) and college also should have a procurement policy (the College's policy for purchasing materials).

Follow Up Action and Plans

Green Audits are exercises which generate considerable quantities of valuable management information. The time and effort and cost involved in this exercise is often considerable and in order to be able to justify this expenditure, it is important to ensure that the findings and recommendations of the audit are considered at the correct level within the organisation and that action plans and implementation programs result from the findings.

Audit follow up is part of the wider process of continuous improvement. Without follow-up, the audit becomes an isolated event which soon becomes forgotten in the pressures of organisational priorities and the passing of time.

4.5 Environmental Education

The following environmental education program may be implemented in the college before the next green auditing:-

- Training programs in solid waste management, liquid waste management, setting up of medicinal plant nursery, water management, vegetable cultivation, paddy cultivation, tree planting, energy management, landscape management, pollution monitoring methods, and rain water harvesting methods.
- Increase the number of display boards on environmental awareness such as – save water, save electricity, no wastage of food/water, no smoking, switch off light and fan after use, plastic free campus etc.
- Activate the environmental clubs
- Set up model rainwater harvesting system, rainwater pits, vegetable garden, medicinal plant garden, paddy fields etc. for providing proper training to the students.
- Conduct exhibition of recyclable waste products

- Implement chemical treatment system for waste water from the laboratories.

Awareness on Carbon Consumption

- Students and Staff members may be made aware of pollution caused by use of vehicles.
- The carbon consumption awareness programs on carbon emission at individual as well as social level will help to avoid air and noise pollution in the campus due to vehicles.

4.6 Conclusion and List of Recommendations

The green audit assists in the process of testing performance in the environmental arena and is fast becoming an indispensable aid to decision making in a college.

The green audit reports assist in the process of attaining an eco friendly approach to the sustainable development of the college. Hope that the results presented in the green auditing report will serve as a guide for educating the college community on the existing environment related practices and resource usage at the college as well as spawn new activities and innovative practices. A few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus and thus sustainable environment and community development.

It has been shown frequently that the practical suggestions, alternatives, and observations that have resulted from audits have added positive value to the audited organisation. An outside view, perspective and opinion often helps staff who have been too close to problems or methods to see the value of alternative approaches. A green audit report is a very powerful and valuable

communications tool to use when working with various stakeholders who need to be convinced that things are running smoothly and systems and procedures are coping with natural changes and modifications that occur.

Common Recommendations

- Adopt an environmental policy for the college
- Establish a purchase policy towards environmental friendly materials
- Introduce UGC Environmental Science course to all students
- Conduct more seminars and group discussions on environmental education
- Students and staff can be permitted to solve local environmental problems
- Renovation of cooking system in the canteen to save gas
- Establish water, waste and energy management systems

Criteria Wise Recommendations

Water Management

- Remove damaged taps and install sensitive taps is possible.
- Drip irrigation for gardens and vegetable cultivation can be initiated.
- Establish rain water harvesting systems for each building.
- Establish water treatment systems.
- Awareness programs on water conservation to be conducted.
- Install display boards to control over use of water.

Energy Management

- Employment of more solar panels and other renewable energy sources.
- Conduct more save energy awareness programs for students and staff.
- Replace computers and TVs with LED monitors.
- More energy efficient fans should be installed.
- Observe a power saving day every year.
- Automatic power switch off systems may be introduced.

Waste Management

- Establish a functional bio gas plant.
- A model solid waste treatment system to be established.
- Practice of waste segregation to be initiated.
- A model vormicomposting plant to be set up in the college campus.
- Establish a plastic free campus.
- Avoid paper plates and cups for all functions in the college.

Green Campus Management

- All trees in the campus should be named scientifically.
- Create more space for planting.
- Grow potted plants in both verandah and class rooms.
- Create automatic drip irrigation system during summer holidays.
- Not just celebrating environment day but making it a daily habit.
- Beautify the college building with indoor plants
- Provide funds to nature club for making campus more green
- Encourage students not just through words, but through action for making the campus green
- Conduct competitions among departments for making students more interested in making the campus green.

Carbon footprint

- Establish a system of car pooling among the staff to reduce the number of four wheelers coming to the college.
- Introduce college bus services to the students and staff.
- Encourage students and staff to use cycles.
- Establish a more efficient cooking system to save gas.
- Discourage the students using two wheelers for their commutation.
- More use of generators every day should be discouraged.

Chapter 5

Exit Meeting

The exit meeting was conducted by the lead auditor Dr. C.M. Joy. It was a mechanism to provide the management and staff a broad feedback on the preliminary findings of the audit team before completing the audited report. The exit meeting was held in the college on 25th April, 2017. Clarification on certain information gathered was sought by the audit team from the management and staff of the college.

Draft Audit Report

The information gathered by the audit team was consolidated as a draft audit report. This draft report was then circulated to the audit team and those directly concerned with the audit to check the report for accuracy. The draft green audit report was also discussed in the exit meeting.

Final Audit Report

The final audit report is the corrected final document which contains the findings and recommendations of the audit. It will also form one of the bases of future audits because the information it contains informs some of the tests and

analyses that need to be performed in the future. Final Audit Report was submitted on 22nd May, 2017 to the Principal of the college.

Follow Up and Action Plans

Green audits form a part of an on-going process. Innovative green initiatives have to be designed and implemented every year to make the college environmentally sustainable. Follow up programs of green auditing recommendations should be done meticulously before the next audit.

Next Audit

In order to promote continuous improvement it is recommended to conduct the next green auditing during the year 2019.

Transparency of Green Audit Report

Green audit report is one of the useful means of demonstrating an organisation's commitment to openness and transparency. If an organisation believes it has nothing to hide from its stakeholders, then it should feel confident enough to make its green audit reports freely available to those who request them. As a basic rule, green audit reports should be made available to all stakeholders.

Acknowledgements:-

CMJ Eco Associates are thankful to the Management and the Principal of the Nirmala College, Muvattupuzha for entrusting processes of Green auditing with us. We thank all the participants of the auditing team especially students, faculty and non-teaching staff who took pain along with us to gather data through survey. We also thank the office staff who helped us during the document verification.

Carbon Footprint Audit

Green Campus Audit

Waste Audit

Energy Audit

Water Audit

Mushroom Cultivation

NIRMALA COLLEGE
MUVATTUPUZHA

GREEN AUDITING
2018-19

Audited by
Heartian Green Audit Team Sacred Heart College Thevara, Cochin-13

Contents

GREEN AUDIT 2018-19 NIRMALA COLLEGE
EXECUTIVE SUMMARY

Nirmala College, Muvattupuzha established by the Catholic diocese of Kothamangalam in 1953, is situated in a sprawling 50 acrd green campus on the mid-land hilly terrain in Avoly Panchayat of Ernakulam district, about 2 kms away from Muvattupuzha town. The college in its fourth cycle of re-accreditation by NAAC has undergone a green audit for a second time (within a span of 3 years) in its progress towards the goal Swachch Nirmala. It has 2730 students, 143 faculty members and 52 non-teacing staff. The audit was undertaken by Heartian Green Audit Team of Sacred Heart College, which had an interdisciplinary composition of experts in various aspects of environment.

The audit period was between December 1, 2018 and Jan. 26th 2019. The audit team verified the documentation on green practices related to bio-diversity, energy management, water resource management, waste management, carbon footprint, agriculture, sustainability aspects, cleanliness etc. which had been prepared through participatory processes within the college.

The audit observed the following:

Sustainable improvement in the efforts by the college on the green front

Compliance efforts regarding suggestions of the previous audit

Involvement of all stakeholders, viz., college management, administration, faculty, student, alumni, etc.

1. Consistent improvement in physical facilities
2. Importance given to biodiversity and farming practices. More than 300 flowering plant species found on the campus is a good sign.

1. Elaborate audit process involving different stakeholders itself works out to be an educative programme for the campus community.
2. The activities effort towards *Swachh Bharath*, offorts at organic farming, conservation of water resources, clean campus, and conservation of biodiversity are to be appreciated.

The audit pose some suggestions and future action plans to be implemented in the campus including:

1. Articulation of comprehensive environment policy.
2. Effort to enhance solar energy trapping systems, with specific achievable target, and a time bound plan for converting non-LED bulbs to LED bulbs.
3. A comprehensive and specific environment education plan including the practices available in the campus to be given to all students in the campus.
4. Setting time bound targets for water treatment, especially from the labs.
5. Greater stress on documentation of bio-diversity and their periodical updation, with specific reference to avian and lepidopteran fauna with respect to their respective seasonality.
6. Annual internal audit to be conducted

We hope this audit will provide a solid platform to identify strengths and weakness of green management in Nirmala College Campus and the College team would take it further.

Heartian Audit Team

28-03-2019

Thevara

SACRED HEART COLLEGE
Autonomous

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Green Audit – Nirmala College Muvattupuzha

CERTIFICATE

This is to certify that the Green Audit Report of Nirmala College is based on the original data collected during the period of study. Further, it is certified that the baseline data was prepared by the internal Green Audit team of Nirmala College, Muvattupuzha and submitted to us. The content of the baseline data of the study has been personally verified by the Green Audit Team for validity and reliability. The data used in the study are original in nature and have not been presented or published elsewhere. Photographs used in the report are either taken directly by the audit team or are given by the internal audit team.

Heartian Green Audit Team

1. Fr. Prasanth Palackappillil (Principal and Convener)
2. Dr. Giby Kuriakose (Coordinator)
3. Dr. Mathew George (Energy Management Expert)
4. Dr. Midhun Dominic (Water Management Expert)

28-03-2019

Thevara

Chapter – 1
Introduction

1.1. Green Audit

The Green audit process was began in the 1970s with an intention of identifying the activities carried out in a given institution or company. This was initiated against the background of growing concern over changing climate and related aspects. Green audit is a tool to identify the range of environmental impacts and assess the compliance of the operations on the development and regular activities within an organisation. It may also assess the compatibility of the operations within an organisation or a company with existing applicable laws and regulations and the expectations of their various stakeholders. It further assesses the possible implications and effect of pollution due to the operations within the organisation. The audit also seeks to identify possible means and methods to save investments, enhance work quality, improve health and safety of their employees, reduce liabilities and reduce the rate of environmental pollution. A continuous process of such audit might result in maintaining the quality of these aspects within the premises of any organisation.

Most companies, government and non-government bodies and other institutions conduct green audit aiming:

- to ensure that the performance of the institution with respect to environmental activities they are involved in, is in compliance with existing laws and regulations.
- To check the functionality and their operating success including water supply, energy related matters and other similar matters that are related to green operations in the campus
- To formulate or update the institution's environmental policy, if warranted.
- To measure the environmental impact of operational process related to green activities in the campus.
- To measure the performance of each green related operations and actions in the campus.

- To generate a database of green activities for continuous monitoring to assess the success of each of them.
- to identify future potential liabilities.
- to align the institution's developmental and day to day activities with the stated vision, mission, strategies, etc.
- to identify possible ways to reduce expenditure and running costs on equipments, appliances, etc. or try enhance revenue income.
- to improve process and materials efficiency, and in response to stakeholder requests for increased disclosure.

The process of green audit based on operational activities within an institution happens not necessarily based on laws and regulations. It might be largely based on awareness and concerns on environmental performances within and outside the institute's premises. This further strengthens the fact regarding social responsibilities of the organisation. Majority of the institutions that conducted green audits in the recent past has realised the importance of the same as they could easily manage their operational costs and provide good atmosphere to their stakeholders. The green audit also provides opportunities to identify full range of operations within an organisation, the impacts of maintaining and functioning of its operational goods and services, the actual source of raw materials for different activities within the organisation, the costs of operations of its offices, functional units, and other facilities. It also provide chances to understand the relationship with employees, material suppliers, stakeholders, etc. The recommendations, findings and suggestions that emerge during green audit would certainly help the management of the organisation to set up future action plan that best suits to them.

1.2. General steps involved in Green Audit

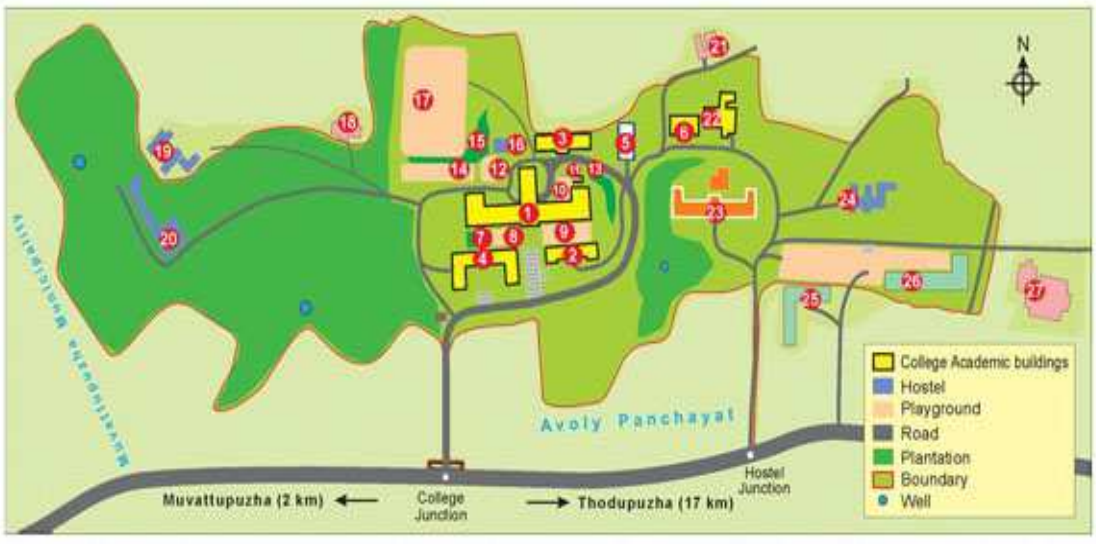
1. Systematic and exhaustive data collection.
2. Evidence based documentation of activities.
3. Regular monitoring.
4. Provide standards and methods for improvement by establishing cost effective green action plan.

Chapter – 2

Nirmala College – A Historical Account

2.1. Brief History

Nirmala College, Muvattupuzha is one among the leading higher education institutions in Kerala. It has completed 65 years of academic mission. The college was established in the year 1954 under the Syro-Malabar Catholic Church management of Kothamangalam Diocese. The college offers undergraduate and post-graduate degrees in the arts, science and commerce streams. Situated in a hilly region surrounded by agricultural farm lands it adopts a healthy culture of keeping traditional as well as modern green practices. The campus is surrounded by heterogeneous vegetation with a fair amount of shady trees naturally found in the locality. The Campus is situated two km away from the Muvattupuzha Township. The campus provides an apt academic ambience free from the hustle and bustle of the town.



1. Nirmala College main block
2. Silver Jubilee Memorial PG block
3. Golden Jubilee Memorial Library & Research Centre
4. Nirmala College of Pharmacy
5. Nirmala Matha Church
6. MCA Block
7. Botanical Garden
8. Tennis Court
9. Open air Auditorium
10. Basketball Court
11. Utility block
12. Volleyball Court
13. Herbal Garden
14. Handball Court
15. Salim Ali Park
16. Sports Hostel
17. Football Stadium
18. Assissi Bhavan – Study House
19. St. Joseph's Ladies' Hostel
20. Little Flower Ladies' Hostel
21. Amala Bhavan – Study House
22. Nirmala Computer Academy
23. Jeevajyothi Pastoral Centre
24. Nirmala College Boys' Hostel
25. Nirmala Junior Public School
26. Nirmala Public & Sr. Sec. School
27. Nirmala Sadan

Figure – 1. Campus infrastructure illustrates the facilities and their respective places

2.2. Geography

The College is situated in Avoly Panchayat of Muvattupuzha Taluk in Ernakulam district. Its locational coordinates are 9°58′38.14″N 76°35′46.81″E. The locality comes under the midland region of Kerala, which has the geographical features of undulated land areas tapering into paddy fields. The raised part of the region provides conducive conditions for the growth of tropical evergreen and deciduous varieties of fruit yielding and other trees.

2.3. General Information

The college offers 17 UG programmes and 14 PG programmes. Seven departments are recognised as research centres. The college has almost 2730 students on its rolls in various programmes with girls forming almost 60%. There are 65 teaching staff in the aided stream in various disciplines. Of which, 36 staff members hold PhD. Further, the college has 68 teachers on ad-hoc basis. More than 64% of the members of different faculties are women. About 52 administrative staff members and supporting staff are working in the college office and different departments. The college is tapping various funding sources from different National and State funding agencies such as University Grants Commission (UGC), Department of Science and Technology (DST), Department of Bio-technology (DBT) and Kerala State Council for Science, Technology and Environment (KSCSTE) for different academic activities including research.

Science departments are supported with DST-FIST. The College gained 'Star College' status (2017-2020) by the Department of Biotechnology, (India). Several major and minor research projects are being carried out by different staff members. Quality publications over a period in reputed national and international journals with high impact factor and h-index.

The college is adopting information technology as per the requirements. It also implement advance learning practices and system with utmost care. Digital Library with over 65000 titles of various disciplines, UGC sponsored INFLIBNET, etc. are

some examples for the same.The college publishes a bi-annual journal called "Science and Society" with ISSN number since 2003. Several endowment lectures inter-disciplinary national seminars and invited talks by experts are some dedications the college shown towards academic excellence.

Various clubs and fora such as National Service Scheme (NSS), National Cadet Corps (NCC), Debate Club, Quiz Club, Catholic Students Movement (CSM), Entrepreneurship Development Club (EDC), Human Rights Club (HRC), Anti-Narcotic Club (ANC), Road Safety Club, Nature Club, etc. are actively involved in the development of student capacity and personality.

The college apparently has a proven track record of its social commitment. The staff, students and managements are trying to reach out to the public and educating them on topics of common interest. Also, the college authorities, using public addressing system or programs such as 'Nirmala Radio' and 'Zero Hour' provides ample opportunity to the students to experience extra-curricular aspects.

Different department celebrations, inter-departmental and inter-collegiate competitions, and other celebrations helps the students to perform and sharpen their talents. All UGC, state government and university norms and directions are practiced without fail in the campus. This enables the students to develop their life with multifaceted and systematic activities. Parent Teacher Association (PTA) and Alumni Association play a good role in between the on campus students and society.

There are five air conditioned and well-furnished conference halls, four auditoriums of ample space, six seminar halls belonging to different departments, five computer labs, three smart class rooms, one language lab, about 250 computers with internet access, six photocopying machines, 22 DLP Projectors and so on. Two Ladies' Hostels, Boys Hostel, Sports Hostel, Cafeteria, Post-office, Bank, Two ATM Counters, Kiosks, Staff Co-operative Society, Electronic workshop, Gymnasium,

Yoga Centre, Chapel, Counselling Centre, Book Stall and Stationery Shop are the strength and diversity of the infrastructure of the campus. This indicates that the campus is aligning its resources with advancement in the world of technology and development. This is very much in line with the vision of the college.

A dedicated and well equipped IQAC cell controls the activities that enables the campus to run along the forerunners of academic institutes in Kerala. The IQAC is well connected with the college management, administrative office, different departments, clubs and fora, etc. It also act as a mediator in organising several activities in the campus. Systematic documentation of activities and academics is a characteristic feature of the college. The IQAC cell enables the campus to get accreditations from different accrediting agencies.

2.4. Previous Green Audit

The previous green audit of Nirmala College Muvattupuzha was done during April-May 2017 by CMJ Eco Associates, Kochi. The report of the green audit was a comprehensive evaluation after thorough evaluation of all aspects related to concerned green activities of the campus. It identified the green activities in the campus involving, management, teachers and students. It also identified lacunas in green practices of the campus and recommended a few practices to be implemented for it to become a green campus. The following were the common recommendations posted in the previous audit.

- Adopt an environmental policy for the college.
- Establish a purchase policy towards environmental friendly materials.
- Introduce UGC Environmental Science course to all students.
- Conduct more seminars and group discussions on environmental education
- Students and staff can be permitted to solve local environmental problems.
- Renovation of cooking system in the canteen to save gas.
- Establish water, waste and energy management systems.(see Green Auditing of Nirmala College, 2017).

The college has apparently tried their level best to implement these recommendations within the stipulated time period. It also adopted other policies and practices that help them to achieve a green campus. The previous audit also suggested criteria wise recommendations such as water management and energy management. Most of the recommendations were dealt with by the campus authority.

2.5. Role of Management in Green Management

The part played by the college management in bringing the campus to a green one is adorable.

The following were the initiatives by the college authorities in green management:

1. The management developed separate teams for implementing green policy in the campus.
2. Regular evaluation system has been established with monitoring cells for green activities in the campus.
3. The management has allotted budget for implementing green policies in the campus.
4. The green monitoring cell evaluates developmental and functional activities and makes recommendations for improvement of the green aspects.
5. These recommendations are implemented without delay and fail.
6. Clubs that are related to green activities are encouraged to conduct programs in and around the campus.
7. The management is keen on the social commitments and tries to reachout to the general public through teachers and students.
8. The management is keen in conducting awareness programs based on its green policies.
9. The support and part played by management is vital in the green campus related activities.

2.6. Swachh Nirmala

Swachh Nirmala, "*Green Nirmala, Clean Nirmala"* is a noval initiative of the entire campus community to institutionalise cleanliness as an integral part of its functioning. The steps taken by the management to achieve this has fulfilled when Nirmala College listed in the MHRD, India Swachhatha Campus ranking twice. Mainly the college aim to achieve the following objectives by implementing Swachh Campus:

- To support the *Swachhta* movement in the country.
- To contribute positively to the environmental consistency.
- To campaign for good health, well-being, clean water, sanitation and clean energy.
- To monitor the environmental performance of the college.
- To formulate and implement a green protocol for students, faculty and campus level.

Chapter – 3
Audit Preparations

3.1. Management

The Nirmala College management was very keen in taking up the recommendation of conducting a green audit after two years after the previous audit. In the light of this, the college management approached Sacred Heart College, which has a consultancy wing offering services like green audit of institutions. The **Heartian Green Audit Team** agreed to conduct the green audit of Nirmala College. After this, there was a preliminary visit to the campus to set up different criteria and questions that are necessary for an updated green audit.

The following were different criteria set forth for the present green audit.

a) Green Practices

b) Water Management

c) Energy Management

d) Carbon Footprint

A detailed questionnaire for each aforementioned criteria was prepared based on the campus visit and thorough evaluation of the previous audit. The audit team in discussion with the college green cell has identified a team including teachers, non-teaching staff and students. The team has collected information that is addressed in the questionnaire.

3.2. Teaching Staff and Students

The following table illustrate the details of internal audit team involved at various levels of this audit process;

Sl No	Name	Designation	Part Played	Audit Involved
1	Dr Gigi K Joseph	Assistant professor, Zoology	Coordinator	Water
2	Albert Kattakayam	1St Msc Zoology	Data Collection	Water
3	Jithu Jacob Lal	1St Msc Zoology	Data Collection	Water
4	Ameena K A	1St Msc Zoology	Data Collection	Water
5	Suhaila P Bavu	1St Msc Zoology	Data Collection	Water
6	Noorasma	1St Msc Zoology	Data Compilation	Water
7	Anand K S	1St Msc Zoology	Data Compilation	Water
8	Dr George James T	Associate Professor, Physics	Coordinator	
9	Anju M S	2Nd Bsc Physics	Data Collection	Energy
10	Rugma Raveendran	2Nd Bsc Physics	Data Collection	Energy
11	Thertha .S	3Rd Bsc Physics	Data Collection	Energy
12	Gissmol Saji	2Nd Bsc Physics	Data Collection	Energy
13	Albin Saju	2Nd Bsc Physics	Data Collection	Energy
14	Amlin Ann Jose	2Nd Bsc Physics	Data Collection	Energy
15	Aadish Kumar	2Nd Bsc Physics	Data Collection	Energy
16	Alwin Saju	2Nd Bsc Physics	Data Collection	Energy
17	Athulya M S	2Nd Bsc Physics	Data Collection	Energy
18	Malavika Manoj	2Nd Bsc Physics	Data Collection	Energy
19	Chithira K Vijay	2Nd Bsc Physics	Data Collection	Energy
20	Ansu Benny	2Nd Bsc Physics	Data Collection	Energy
21	Manjima Jijo	2Nd Bsc Physics	Data Compilation	Energy
22	Anuja Rose	3Rd Bsc Physics	Data Compilation	Energy
23	Ashitha Thankachan	3Rd Bsc Physics	Data Compilation	Energy
24	Aadish Kumar	2Nd Bsc Physics	Data Collection	Carbon Audit
25	Alwin Saju	2Nd Bsc Physics	Data Collection	Carbon Audit
26	Athulya M S	2Nd Bsc Physics	Data Collection	Carbon Audit
27	Malavika Manoj	2Nd Bsc Physics	Data Compilation	Carbon Audit
28	Chithira K Vijay	2Nd Bsc Physics	Data Compilation	Carbon Audit
29	Dr. N Shibin Mohanan	Assistant Professor, Botany	Coordinator	Green Audit
30	Dr.Sibi C Varghese	Assistant Professor In Contract, Botany	Coordinator	Green Audit
31	Merin Jose	3Rd Botany	Data Collection and Compilation	Green Audit
32	Muhammed Shahinkhan	3Rd Botany	Data Collection and Compilation	Green Audit
33	Aleena Johnson	3Rd Botany	Data Collection	Green Audit
34	Krishna Venu	3Rd Botany	Data Collection	Green Audit
35	Amalendu S	3Rd Botany	Data Collection	Green Audit
36	Anaswara Sasi	3Rd Botany	Data Collection	Green Audit
37	Geena Johny	3Rd Botany	Data Collection	Green Audit
38	Bhagya M Nair	3Rd Botany	Data Collection	Green Audit
39	Divya Dinesan	3Rd Botany	Data Compilation	Green Audit
40	Abhiraj M N	3Rd Botany	Data Collection	Green Audit
41	Don Jose	2Nd Botany	Data Collection	Green Audit
42	Shibin Varghese	1St Bsc Botany	Data Collection	Green Audit

3.3. The Green Audit Process:

1. Selection of area/activities/parts of the campus.
2. Planning of visit to campus to discuss about the audit process.
3. Scope of audit process was identified in consultation with the auditee.
4. A meticulous plan of action was designed.
5. A team consisting of teachers, non-teaching staff and students was constituted with specific tasks and a proper time schedule.
6. Data pertaining to identified parameters for green auditing of the campus were collected directly through an on-site visit.
7. Available background information on the identified activities and other parameters were collected.
8. The role of each stakeholder in green related activities has been collected.
9. Historical aspects of green activities in the campus including flora fauna, water usage and waste generation, etc. were collected.
10. A questionnaire based on the preliminary visits and other evaluations was communicated to the authorities who are involved in the in house data collection.
11. Data collection based on questionnaire.
12. Visit to the campus by audit team.
13. Data analysis and evaluation.
14. Discussion on the findings.
15. Report preparation.

3.4. Onsite audit activities

1. The preliminary visit and meeting with the campus authorities was the first step between the audit team and auditee.
2. Site inspection for determining parameters for audit.
3. Site visit and evaluation of collected information of the audit team.
4. Meeting with the Principal, IQAC coordinator, teachers, non-teaching staff and students.
5. Meeting with the in house audit team for evaluation and clarifications.

Chapter – 4
Green Audit

4.1. Inspection

The preliminary visit in connection with the pre-audit process to the campus had identified criteria for audit, parameters to be evaluated and time schedule of green audit of Nirmala College. It included meeting with the Principal, IQAC coordinator, teachers in charge of different green activities of the campus and students representing different departments, clubs and fora. This enabled the auditing to gather all necessary preliminary information that is useful in preparing pre auditing questionnaire and data sheets. The on-site audit team collected information based on questionnaire and data sheet.

4.2. Questionnaire

The detailed questionnaire (Annexure I, II III & IV) was handled by three different audit teams and information was gathered. Information pertaining to green activities, water management, energy management and carbon foot print was analysed under different titles and sub-titles. This was based on the parameters identified. The questionnaire was comprehensive covering qualitative and quantitative dimensions.

4.3. Evaluation of documents and reports

The audit visit to the campus evaluated documents and reports (departments, clubs and fora) that are necessary for the audit process. This further strengthened the claims made by the campus authority on green operations in the campus. To generate future action plan, the audit team had a detailed discussion with different in house team in the institute and a concluding discussion session with IQAC coordinator and Bursar was done to finalise the plans.

4.4. Findings and Analysis

4.4.1. Analysis of Green Practices

4.4.1.1. Gardens

Nirmala College is situated in a peri-urban area where farming and agriculture are still being practiced in and around the campus. The campus biodiversity (Table-1) is an example of how they have imbibed the local practices and culture in preserving local biodiversity within the campus. The college management and authorities who are responsible for greening the campus is aptly adopting methods to preserve local flora and fauna. The botanical garden and different concept based gardens (spice garden, star plants garden, medicinal plants garden, *Dasapushpam* garden, ayurvedic preparation based plants (eg. *Nalpamara*, *thriphala,* etc.), are ideal for academic practices and learning while practicing.

Table – 1. Campus Flora

Sl. No.	Name of plants	No. of plants
1	*Abelmoschus esculentus*	50
2	*Acacia mangium*	10
3	*Acacia caesia*	5
4	*Acalypha wilkesiana*	5
5	*Achras sapota*	3
6	*Acorus calamus*	2
7	*Adenanthera pavonina*	5
8	*Adhatoda vasica*	5
9	*Agave sp.*	5
10	*Aglaonema sp.*	10
11	*Agrostistachys indica*	1

12	*Ailanthus excelsa*	5
13	*Albizia chinensis*	5
14	*Aleurites moluccana*	2
15	*Allamanda cathartica*	55
16	*Aloe vera*	5
17	*Alpinia galanga*	5
18	*Alpinia nutan*	5
19	*Alstonia scholaris*	3
20	*Alternanthera brasiliana*	40
21	*Amorphophallus paeoniifolius*	10
22	*Anacardium occidentale*	5
23	*Ananas comosus (Pineapple)*	100
24	*Annona muricata*	1
25	*Anthocephalus cadamba*	2
26	*Anthurium species*	20
27	*Antidesma acidum*	3
28	*Antigonon leptopus*	2
29	*Aphanamixis polystachya*	1
30	*Aporosa lindleyana*	1
31	*Arachis pintoi*	500
32	*Aralia sp.*	10
33	*Areca catechu*	46

34	*Areca palma*	10
35	*Aristolochia indica*	5
36	*Artabotrys hexapetalus*	1
37	*Artabotrys odoratissimus*	1
38	*Artocarpus heterophyllus*	30
39	*Artocarpus hirsuta*	125
40	*Artocarpus integrifolia*	10
41	*Asparagus racemosus*	2
42	*Azadirachta indica*	2
43	*Bacopa monnieri*	50
44	*Baliospermum montanum*	2
45	*Bambusa glaucophylla*	2
46	*Bambusa sp.*	2
47	*Bauhinia variegata*	2
48	*Bauhinia acuminate*	2
49	*Bauhinia tomentosa*	1
50	*Begonia sp.*	10
51	*Bignonia sp.*	2
52	*Blumea mollis*	10
53	*Bombax malabaricum*	
54	*Bougainvillea sp.*	50
55	*Brassica oleracea*	25

56	*Bridelia retusa*	2
57	*Brunfelsia calycinae*	1
58	*Cactus sp.*	2
59	*Caesalpinia coronaria- divi-divi*	2
60	*Caesalpinia pulcherrima*	3
61	*Calliandra rheedii*	2
62	*Callistemon lanceolatus*	1
63	*Calophyllum inophyllum- Punna*	1
64	*Cananga odorata*	2
65	*Canarium strictum*	1
66	*Canna indica*	15
67	*Capscicum annum*	10
68	*Capsicum frutescens*	15
69	*Carallia brachiata*	1
70	*Carica papaya*	15
71	*Cascabela thevetia*	1
72	*Cassia fistula*	13
73	*Casuarina equisetifolia*	5
74	*Centella asiatica*	28
75	*Chrysanthemum sp.*	5
76	*Chrysophyllum cainito*	2
77	*Cinnamomum verum* –Lauraceae- Edana	2

78	*Cinnamomum zeylanicum*	1
79	*Cissus quadrangularis*	1
80	*Citharexylum spinosum*- Parijatham	1
81	*Citrus limon*	3
82	*Clematis elliptica*	2
83	*Clerodendrum thomsoniae*	10
84	*Clitoria ternatea*	2
85	*Coccinia grandis*	2
86	*Cocos nucifera*	360
87	*Codiaeum variegatum*	2
88	*Coffea arabica*	150
89	*Coleus aromaticus*	5
90	*Colocasia esculenta*	25
91	*Coriandrum sativum*	5
92	*Costus pictus*	5
93	*Couroupita guianensis*	1
94	*Crossandra infundibuliformis*	1
95	*Croton sp.*	25
96	*Cuphea minuta*	10
97	*Curcuma longa*	2
98	*Cuscuta reflexa*	2
99	*Cycas circinalis*	1

100	*Cycas revoluta*	1
101	*Cymbopogon citratus*	2
102	*Cyrtostachys renda- Red palm*	5
103	*Dalbergia latifolia*	1
104	*Dalbergia sissoo*	1
105	*Datura metel*	1
106	*Delonix regia*	1
107	*Derris trifoliata*	1
108	*Dieffenbachia sanguine*	15
109	*Dillenia bracteolate*	1
110	*Dillenia indica*	1
111	*Dioscorea esculenta*	5
112	*Diospyros blancoi- velvet apple*	1
113	*Diospyros peregrine*	1
114	*Dracaena braunii*	5
115	*Dracaena fragrans*	2
116	*Dracaena sp.*	5
117	*Duranta plumieri*	2
118	*Duranta repens*	2
119	*Elettaria cardamomum*	10
120	*Emblicaofficinalis*	2
121	*Ervatamia coronaria*	1

122	*Erythrina indica*	1
123	*Erythroxylum monogynum-*	
124	*Eugenia jambos*	3
125	*Euodia lunu-ankenda*	1
126	*Euphorbia hirta*	50
127	*Euphorbia rothieri*	5
128	*Euphorbia sp.*	5
129	*Evodia lunu ankenda*	2
130	*Evodia roxburghiana*	1
131	*Excoecaria bicolor-*	1
132	*Filicium decipiens*	1
133	*Ficus asperrima*	2
134	*Ficus auriculata*	1
135	*Ficus bengalensis*	2
136	*Ficus benjamina*	1
137	*Ficus elastica*	4
138	*Ficus hispida*	10
139	*Ficus racemosa*	1
140	*Ficus religiosa*	2
141	*Filicium decipiens*	1
142	*Flacourtia montana*	1
143	*Garcinia gummi-gutta*	2

144	*Garcinia mangostana*	1
145	*Gardenia gummifera*	3
146	*Gardenia jasminoides*	5
147	*Gliricidia maculata*	1
148	*Glycosmis pentaphylla*	5
149	*Hamelia patens*	1
150	*Helicteres isora*	2
151	*Hevea brasiliensis*	200
152	*Hibiscus rosa-sinensis*	15
153	*Holmskioldia sanguinea*	1
154	*Holoptelea integrifolia*	2
155	*Holarrhena antidysenterica*	1
156	*Hopea parviflora*	2
157	*Humboldtia brunonis*	1
158	*Hylocereus undatus*	1
159	*Hypoestes phyllostachya*	1
160	*Impatiens balsamina*	10
161	*Indigofera sp.*	1
162	*Ixora chinensis*	5
163	*Ixora coccinea*	5
164	*Ixora philippinensis*	2
165	*Jasminum angustifolium*	1

166	*Jasminum grandiflorum*	5
167	*Jasminum rigidum*	2
168	*Justicia beddomei*	25
169	*Justicia gendarussa*	15
170	*Kaempferia galangal*	2
171	*Kleinhovia hospita*	2
172	*Kopsia fruticosa*	1
173	*Lagerstroemia flos reginae*	2
174	*Lagerstroemia microcarpa*	1
175	*Lannea coromandelica*	1
176	*Lantana camara*	25
177	*Lawsonia inermis*	2
178	*Lepisanthes tetraphylla*	1
179	*Lycopersicum esculentum*	25
180	*Macaranga peltata*	1
181	*Madhuca neriifolia*	1
182	*Mangifera indica*	40
183	*Manihot esculenta*	25
184	*Manilkara zapota*	2
185	*Marsilea quadrifolia*	5
186	*Meiogyne pannosa*	2
187	*Melastoma malabathricum*	10

188	*Mentha piperita*	2
189	*Mesua thwaitesii*	1
190	*Michelia champaca*	2
191	*Millingtonia hortensis*	2
192	*Mimusops elengi*	31
193	*Momordica charantia*	2
194	*Moringa oleifera*	5
195	*Morua alba*	5
196	*Murraya exotica*	5
197	*Murraya koenigii*	2
198	*Musa paradisiaca*	200
199	*Mussaenda erythrophylla*	5
200	*Mussaenda frondosa*	2
201	*Myristica fragrans*	12
202	*Naregamia alata*	5
203	*Nelumbium speciosum*	2
204	Nephelium lappaceum	11
205	*Nephelium lappaceum*	2
206	*Nerium indicum*	10
207	*Nymphaea pubescens*	5
208	*Ochna obtusata*	4
209	*Ocimum basilicum*	10

210	*Olea dioica*	6
211	*Olea dioica*- Karivetti	1
212	*Oroxylum indicum*	2
213	*Ocimum sanctum*	10
214	*Osmoxylon lineare*	10
215	*Oxalis purpurea*	50
216	*Pachystachys lutea*	5
217	*Palm sp.*	2
218	*Pandanus odoratissimus*	2
219	*Passiflora miniata*	2
220	*Passiflora sp*	5
221	*Pedilanthus tithymaloides*	10
222	*Peltophorum ferrugineum*	35
223	*Peltophorum pterocarpum*	10
224	*Peltophorum roxburghii*	10
225	*Phaseolus vulgaris*	5
226	*Pholidota imbricata*	1
227	*Pimenta dioica*	2
228	*Piper longum*	5
229	*Piper nigrum*	5
230	*Pithecellobium saman*	2
231	*Plinia cauliflora*	1

232	*Plumbago indica*	5
233	*Plumbago zeylanica*	2
234	*Plumeria acutifolia*	4
235	*Plumeria indica*	5
236	*Poeciloneuron indicum*	1
237	*Poinsettia pulcherrima*	2
238	*Polyalthia longifolia*	5
239	*Poncirus trifoliata*	2
240	*Pongamia glabra*	5
241	*Pongamia pinnata*	2
242	*Pouteria campechiana*	1
243	*Psidium guajava*	15
244	*Punica granatum*	1
245	*Quisqualis indica*	2
246	Rauvolfia serpentina	2
247	*Rhoeo discolor*	10
248	*Ricinus communis*	2
249	*Rivina humilis*	5
250	*Rosa sp.*	5
251	*Roystonea regia*	10
252	*Salacia fruticosa*	2
253	*Salvia officinalis*	5

254	*Sansevieria sp.*	10
255	*Saraca india*	2
256	*Sauropus quadrangularis*	5
257	*Schefflera arboricola*	10
258	*Schleichera oleosa*	2
259	*Simarouba glauca*	2
260	*Solanum melongena*	5
261	*Spathodea campanulata*	2
262	*Spathoglottis sp*	10
263	*Spathiphyllum*	3
264	*Spondias indica*	2
265	*Stereospermum suaveolens*	1
266	*Stereospermum colais*	2
267	Strelitzia reginae	1
268	*Strobilanthus ciliates*	15
269	*Strychnos nux-vomica*	1
270	*Swietenia mahagoni*	100
271	*Symplocos cochinchinensis*	2
272	*Synsepalum dulcificum*	1
273	*Syngonium podophyllum*	50
274	*Syzygium aqueum*	1
275	*Syzygium aromaticum*	1

276	*Syzygium cumini*	8
277	*Syzygium malaccense*	1
278	*Syzygium zeylanicum*	1
279	*Tabernaemontana dichotoma*	5
280	Tamarindus indica	7
281	Tecoma stans	2
282	Tectona grandis	15
283	Terminalia arjuna	2
284	*Terminalia bellirica*	2
285	*Terminalia catappa*	10
286	*Terminalia paniculata*	5
287	*Theobroma cacao*	5
288	*Thevetia peruviana*	2
289	*Thottea siliquosa*	3
290	*Thuja sp.*	2
291	*Thunbergia erecta*	5
292	*Thunbergia laurifolia*	1
293	*Thymus vulgaris*	10
294	*Trema orientalis*	2
295	*Trichosanthes cucumerina*	2
296	*Uvaria narum*	2
297	*Vanilla planifolia*	5
298	*Vateria indica*	1

299	*Vigna radiata*	25
300	*Vinca rosea*	50
301	*Woodfordia fruticosa*	2
302	*Zingiber officinale*	10

Students of related subjects are actively involved in gardening, maintenance, etc. of gardens within the campus. Further, they find the garden an apt place for discussions, combined studies, practicals, aesthetic purposes, spending leisure time, etc. Students are learning garden techniques by working in the garden with the help of teachers concerned. Garden makes ample space and scope for them to conduct practicals including budding, grafting, lawn making, etc. for studens of Botany and Environmental studies. They also find this as a good opportunity to observe and learn about birds and butterflies. Students from department of Zoology learn about insects and their role in pollination by observing the same in the botanical garden. So far, 67 plants are identified and maintained in the garden (Table – 2). Students of Botany are doing bee keeping and are learning the bee preference towards plants from the garden. Preparation of vermi-compost and training on the same for those who are interested are conducted in the garden. There are enough resources (species of flora and fauna) available in different gardens and these resources are being utilized by the Botany and Zoology students for project works.

Table – 2. Plants in the Botanical Garden

Sl.No	Name of Plants	Number of Plants
1	*Adenanthera pavonina*	1
2	*Adhatoda vasica*	3
3	*Aglaonema sp.*	10
4	*Allamanda cathartica*	5
5	*Anthurium species*	5

6	*Arachis pintoi*	>200
7	*Aralia sp.*	5
8	*Asparagus racemosus*	1
9	*Bambusa glaucophylla*	1
10	*Bauhinia tomentosa*	2
11	*Bauhinia variegata*	1
12	*Begonia sp.*	2
13	*Bougainvillea sp.*	10
14	*Cactus sp.*	5
15	*Callistemon lanceolatus*	1
16	*Canna indica*	5
17	*Clematis elliptica*	2
18	*Clitoria ternatea*	2
19	*Cocos nucifera*	5
20	*Costus sp.*	7
21	*Costus pictus*	2
22	*Crossandra infundibuliformis*	1
23	*Croton sp.*	11
24	*Cuphea ignea*	7
25	*Cycas circinalis*	1
26	*Datura metel*	1
27	*Dieffenbachia sanguine*	1
28	*Dracaena braunii*	2
29	*Dracaena fragrans*	3
30	*Duranta plumieri*	1

31	*Duranta repens*	2
32	*Ervatamia coronaria*	2
33	*Poinsettia pulcherrima*	1
34	*Gardenia gummifera*	3
35	*Gardenia jasminoides*	2
36	*Hamelia patens*	1
37	*Hibiscus rosa-sinensis*	3
38	*Holmskioldia sanguinea*	1
39	*Hypoestes phyllostachya*	3
40	*Ixora chinensis*	2
41	*Ixora philippinensis*	1
42	*Jasminum grandiflorum*	1
43	*Kopsia fruticosa*	1
44	*Lantana camara*	10
45	*Melastoma malabathricum*	5
46	*Murraya exotica*	2
47	*Nelumbium speciosum*	3
48	*Nerium indicum*	2
49	*Nymphaea pubescens*	2
50	*Osmoxylon lineare*	6
51	*Pachystachys lutea*	4
52	*Pandanus odoratissimus*	2
53	*Passiflora sp*	1
54	*Piper longum*	2

55	*Piper nigrum*	3
56	*Plumeria indica*	1
57	*Quisqualis indica*	2
58	*Rivina humilis*	4
59	*Rosa sp.*	2
60	*Salvia officinalis*	2
61	*Sansevieria roxburghiana*	5
62	*Schefflera arboricola*	3
63	*Thevetia peruviana*	1
64	*Thuja sp.*	3
65	*Thunbergia laurifolia*	2
66	*Uvaria narum*	1
67	*Woodfordia fruticosa*	1

It would be nearly impossible to learn taxonomy and morphology for Botany students if plants are not available nearby. Different species of plants in the garden make this possible. Students are keen in maintaining species that are dealt with in their syllabus for practicals and further observation.

The authorities are keen in developing the garden to higher levels by getting funds from sources such as spices board. The grants in aid was rightly spent in developing a spice garden with respective identification names and other details pertaining to the species in the spice garden.

The department of Botany and Nature Club initiated an agriculture garden where different species such as ginger, turmeric, chilli, etc are grown (Table-3). The vegetables harvested from the vegetable garden are utilised either in different

messes or sell it out among the staff and students. A portion is shared among the volunteers.

Table – 3. Vegetables and other Crop Plants

Sl. No.	Species of plants	Approximate Yield (kg)
1	*Abelmoschus esculentus* – *ladies finger*	30
2	*Amaranthus spp* – cheera	15
3	*Amorphophallus paeoniifolius* – chena	50
4	*Benicasa hispoida* – kumblanga	50
5	*Brassica oleracea* var. *boatrytis* – cauliflower	10
6	*Brassica oleracea var.capitata*– cabbage	15
7	*Capcicum annum* – chilly	5
8	*Carica papaya* – papaya	75
9	*Coccinia grandid* – koval	60
10	*Colocasia esculenta* – chembu	180
11	*Cucumis sativus* – cucumber	220
12	*Cucurbita mellonia* – pumkin	250
13	*Curcuma longa* – turmeric	25
14	*Dioscorea alalta* – cherukizhangu	40
15	*Dioscorea esculenta* – kachil	90
16	*Lagenaria siceraria* – bottle gourd	20
17	*Lycopersicum esculentum* – tomato	18
18	*Manihot esculenta* – tapioca	150

19	*Momordica charantia* – bitter gourd	30
20	*Moringa oleifera* – drum stick	20

4.4.1.2. Arboretum

Nirmala College is maintaining an arboretum where natural species of plants are maintained (Table – 4). The plant diversity in the arboretum includes star plants, concept oriented plants based on *ayurvedic* preparations, etc. It is a place to conserve endemic plant species as well. The college authority is keen to enrich the arboretum by adding plants of different values.

Table – 4. List of Plants in the Arboretum

Sl. No.	Species of plant	Number of Plants
1	*Garcinia gummi-gutta*	2
2	*Cinnamomum verum*	2
3	*Mangifera indica*	1
4	*Saraca asoca*	1
5	*Annona muricata*	1
6	*Calophyllum inophyllum*	1
7	*Terminalia bellirica*	1
8	*Simarouba glauca*	1
9	*Bauhinia variegata*	1
10	*Stereospermum colais* var. *colais*	2
11	*Mimusops elengi*	2
12	*Artocarpus heterophyllus*	2
13	*Careya arborea*	1

14	*Terminalia cuneata*	2
15	*Briedelia retusa*	3
16	*Racosperma mangium*	1
17	*Swietenia macrophylla*	4
18	*Artocarpus hirsutus*	3
19	*Bombax malabaricum*	1
20	*Pongamia glabra*	2
21	*Delonix regia*	3
22	*Pitheclobium saman*	1
23	*Terminalia catappa*	1
24	*Syzygium cumini*	2
25	*Macaranga peltata*	1
26	*Holorrhena antidysenterica*	1
27	*Michelia champaca*	1
28	*Oroxylum indicum*	1
29	*Adenanthera pavonina*	1
30	*Lagerstroemia speciosa*	2
31	*Alstonia scholaris*	1
32	*Ficus benjamina*	1
33	*Millingtonia hortensis*	1
34	*Diospyros peregrine*	1
35	*Hopea parviflora*	1
36	*Ficus carica*	1
37	*Chrysophyllum cainito*	1
38	*Toona ciliata*	1

4.4.1.3. Fruit Yielding Plants

Currently, in Kerala, there is a trend in cultivation of different species of fruit yielding plants in farms and orchards. Nirmala College is also giving emphasis in adding new species and varieties of different fruit yielding plants in their campus. This would add value and awareness among students and staff about such plants. There are about 20 different fruit yielding species are available in the campus (Table – 5). Although the fruit yielding species are cultivated at different places in a scattered manner, they are properly labelled and displayed.

Table – 5. List of Fruit Yielding Plants

Sl. No.	Species of plants	Number of Plants
1	*Ananus comosus*	5
2	*Annona muricata*	4
3	*Annona squamosa*	3
4	*Artocarpus integrifolia*	8
5	*Artocarpus hirsutus*	5
6	*Citrus limon*	4
7	*Garcinia mangostana*	3
8	*Hylocereus undatus*	2
9	*Mangifera indica*	3
10	*Morus alba*	2
11	*Musa paradisiaca*	1
12	*Nephelium lappaceum*	2
13	*Nephelium mutabile*	1

14	*Passiflora edulis*	2
15	*Phyllanthus emblica*	4
16	*Psidium guajava*	5
17	*Punica granatum*	6
18	*Spondias pinnata*	2
19	*Syzygium jambos*	3
20	*Syzygium samarangense*	4
21	*Tamarindus indica*	2

4.4.1.3. Medicinal Plants

The diversity of medicinal plants in any place, especially in an academic campus is indicative the emphasis that the institute given towards traditional knowledge. This would be a platform for awareness, learning, and source for local usage. Nirmala College is maintaining a medicinal plant garden that consists of a good wealth of plant species. The present status of flora that have medicinal importance is representative of regional and local floristic diversity. About 89 plant species in the medicinal plant garden were found maintained on the campus (Table – 6).

Table – 6. Medicinal Plants

Sl. No.	Name of Plants	No. of Plants
1	*Achyranthes aspera*	2
2	*Adenanthera pavonina*	5
3	*Adhatoda vasica*	1
4	*Aerva lanata*	6
5	*Aloe vera*	5

6	*Alpinia calcarata*	6
7	*Alpinia galanga*	3
8	*Alstonia scholaris*	4
9	*Andrographis paniculata*	2
10	*Anisomeles indica*	6
11	*Asparagus racemosus*	2
12	*Azadirachta indica*	3
13	*Bacopa monnieri*	4
14	*Biophytum sensitivum*	3
15	*Boerhavia diffusa*	5
16	*Butea monosperma*	2
17	*Calotropis gigantea*	2
18	*Cardiospermum halicacabum*	5
19	*Careya arborea*	8
20	*Cassia fistula*	4
21	*Cassia occidentalis*	2
22	*Catharanthus roseus*	3
23	*Centella asiatica*	6
24	*Chasalia curviflora*	3
25	*Cinnamomum zeylanicum*	6
26	*Clerodendrum viscosum*	3
27	*Clitoria ternatea*	5
28	*Cocos nucifera*	2

29	*Coffea arabica*	2
30	*Coriandrum sativum*	3
31	*Costus pictus*	4
32	*Curcuma longa*	1
33	*Cycas circinalis*	2
34	*Datura metel*	3
35	*Datura stramonium*	5
36	*Diospyros sp.*	4
37	*Duranta plumieri*	5
38	*Eclipta alba*	2
39	*Elephantopus scaber*	2
40	*Elettaria cardamomum*	3
41	*Emblica officinalis*	2
42	*Emelia sonchifolia*	3
43	*Euphorbia hirta*	2
44	*Evolvulus alsinoides*	2
45	*Ficus benghalensis*	4
46	*Ficus microcarpa*	4
47	*Ficus racemosa*	3
48	*Ficus religiosa*	2
49	*Garcinia mangostana*	5
50	*Heliotropium indicum*	2
51	*Hemidesmus indicus*	1

52	*Hibiscus rosa-sinensis*	3
53	*Holoptelea integrifolia*	6
54	*Holarrhena antidysenterica*	4
55	*Hopea parviflora*	8
56	*Ipomoea sepiaria*	3
57	*Ixora coccinea*	6
58	*Kaempferia galangal*	5
59	*Lannea coromandelica*	4
60	*Leucas aspera*	2
61	*Mimosa pudica*	3
62	*Murraya koenigii*	2
63	*Myristica fragrans*	5
64	*Nelumbium speciosum*	3
65	*Ocimum basailicum*	5
66	*Ocimum sanctum*	4
67	*Oxalis corniculata*	2
68	*Phyllanthus niruri*	3
69	*Pimenta dioica*	6
70	*Piper longum*	5
71	*Plumbago rosea*	2
72	*Pongamia pinnata*	3
73	*Psidium guajava*	4
74	*Rauvolfia serpentina*	2

75	*Rosa indica*	3
76	*Sansevieria roxburghiana*	1
77	*Saraca indica*	3
78	*Scoparia dulcis*	1
79	*Strobilanthes ciliatus*	2
80	*Strychnos nux vomica*	3
81	*Syzygium aromaticum*	2
82	*Terminalia catappa*	5
83	*Tinospora cordifolia*	6
84	*Tragia involucrata*	4
85	*Tridax proccumbens*	2
86	*Vateria indica*	3
87	*Vernonia cinerea*	5
88	*Vitex negundo*	2
89	*Zingiber officinale*	2

4.4.1.4. Awareness Programs

Several significant and fruitful awareness programs both students and staff of the campus are arranged every year in the campus. Reflections from students are evident how effective such awareness programs conducted in the campus.

Major programs conducted in the campus during the last three years are:

Environment Related

1. Nature camps.
2. Field visits to different types of ecosystems.
3. Observances of Environment Day, Wetland day, Ozone day etc.

4. Arranging seminars and symposiums on awareness and conservation by nature and natural systems.

Conservation Activities

5. Collection and distribution of saplings.
6. Bird and Butterfly watching.
7. Sapling Planting etc.

Best Practices

8. 2016-2017 organic farming
9. 2016-2017 Paddy cultivation
10. Engaging students in maintaining spices garden
11. Engaging students in maintaining herbal garden and medicinal garden.
12. Maintaining of *shanthistal*
13. Participation of teachers in different orientation program
14. Initiation of vermi-compost.
15. Initiation of bio gas plant.

Trainings and Workshops

16. Mushroom cultivation workshop.
17. Apiculture workshop
18. Flower arrangements workshop
19. Workshop on eco-friendly carry bags

Campaigns

20. Plastic free campaign
21. Nature camps, field trips and

Some of these activities are year round programs and others are regular year wise or semester wise or any other stipulated time bound programs. This indicates that students and teachers concerned are actively involved in green activities in the campus.

4.4.2. Water Management

4.4.2.1. Major Findings.

- The ponds and other water resources in the college are well maintained.
- Separate tanks were installed for different blocks and for different purposes. This enables to use water with maximum potential control.
- The college has rain water harvesting mechanism which is to be appreciated. This will help generate awareness about the importance of water conservation and shall act as a model system to be followed by other institutions as well.
- Wick irrigation farming and drip irrigation systems present in the campus were found to be effective in reducing the amount of water used in agriculture sector.
- The college organizes awareness programmes on water conservation frequently to spread the message of significance of conserving water.
- Students who are involved in green committees are doing a good job in water related awareness programmes.
- 92304 L of water is used per day by the college for its different uses (Table – 7).
- 200 L of water per day is lost through the leaking of pipes (Table – 7).
- The water consumption in the summer season is significantly high compared to other months.

Table- 7. Details of water analysis of Nirmala College

Activity	Average use per activity in liters	Number of activity/ day	Water use/person/day (L)	Number of persons using water	Total water consumption/day(L)
Washing hands and face	6L	thrice	2L/head	3009	18054L
Bath	60L	twice	30L/head hostel only	390	23400L

Washing clothes	20L	once	20L/head hostel only	390	7800L
Toilet flush	10L	at least 3	10L/head	500	5000L
Leaking/dripping(1 drop/second /day)	nil	nil	nil	nil	200L
Garden use	1500L	twice	nil	nil	3000L
Cooking (average)	3000L	four times	nil	500	12000L
Cleaning Floor	10000L	once	nil	nil	10000L
Cleaning college bus	nil	nil	nil	nil	nil
Lab uses	2.5L	twice	5L	360	850L
Construction work	3000L	twice	nil	nil	6000L
Any other activity	3000L	twice	nil	nil	6000L
Total water use					92304L

4.4.2.2. Suggestions

- There is no particular mechanism to find the water wastage. This has to be dealt with utmost care without delay and has to be included in the future action plan.
- There is no water consumption monitoring system in the college.
- The college does not have waste water treatment for waste water generated from laboratories, canteen, hostel kitchen, toilets, bathrooms and office rooms.
- The waste water from canteen and kitchens is not suitably controlled and is not used for gardening. This has to be addressed and suitable action plans have to be evolved.

- No adequate facilities available in the college to treat the waste water from chemical laboratories.
- Water fountain in the college was found to be dysfunctional. This need to be activated.

4.4.3. Energy Management

An assessment of energy consumption, energy sources used, energy management, lighting devices used and other appliances used by the campus community is an important aspect of sustainability of the community. Hence this is a relevant aspect of the assessment. The audit team assessed the number of electrical appliances and their respective uses in terms of consumption of energy per month in KWh. This indicates the energy management of the campus. Based on the assessment we made suggestions and recommendations.

Table- 8. List Electrical Instruments

Sl. No.	Name Instruments	No. of Instruments
1	Heating Mantle	23
2	Power Supply	66
3	UV-Disinfection System	54
4	Magnetic Stirrer	19
5	Function Generator	18
6	Fridge	12
7	Fume Exhaust Hood	12
8	Exhaust Fan	7
9	Centrifuge	6
10	Mixer Grinder	5
11	Stabilizer	5
12	Conductivity Meter	4
13	Digital Potentiometer	4
14	Furnace	4
15	Network Switch	4
16	Weighing Balance	4
17	Incubator	2

18	Mixer Galvan	2
19	Photoelectric Colorimeter	2
20	Concentric Rig Bath	1
21	Distil Unit	1
22	Electric Kettle	1
23	Electron Microscope	1
24	Laminar Air Flow	1
25	Mixer	1
26	pH Meter	1
27	Pump	1
28	Rota Evaporator	1
29	UV Spectrophotometer	1
30	Computer	397
31	Hot Air Owen	2
32	Iron Box	2
33	Oven	2
34	Hot Air Owen	1
35	Induction Cooker	1
36	Water Bath	1
37	Wax Bath	1
38	LCD TV	21
39	Cooler	8
40	Freezer	1
41	Street Light (Led)	71
42	Street Light (Sodium)	6
43	Street Light (Tube)	1
44	Inverter	6
45	Ups	3
46	Fan	890
47	Tube	400
48	Led Bulb	845
49	Led Tube	171
50	Cfl	154
51	Speaker	48
52	Projector	30
53	Ac	25
54	Bulb	24
55	Printer	22
56	LPG Per Month	11
57	Amplifier	10

58	Wi-Fi Modem	7
59	Photocopier	5
60	Aquarium	1
61	Scanner	3
62	Barcode Reader	2
63	Electric Bell	2
64	Server	2
65	Blue Ray Player	1
66	Coffee Machine	1
67	Duplicator	1
68	I Mac	1
69	Washing Machine	1
70	Treadmill	1
71	Server Unit	1
72	Tailoring Machine	1

4.4.3.1. Renewable Source of Energy – Solar Power Plants

The college has established a 20 KW solar power plant, of which 15 KW is shared on common grid (KSEB) and 5KW is utilised in the campus itself. The beneficiary of the solar power plant is the MCA building. At present it is working with its fullest establishment capacity and the campus is making maximum use out of it. By learning the importance and power conservation by tapping energy from renewable energy sources, the management plan to extend the capacity of the solar power plant by installing more solar power plants in the campus.

Following are the details of generation and utilization of power generated out of solar power plants.

- Total energy produced by the solar panels during 2018-19 – 32850 KWh
- Energy supplied to the KSEB grid – 21250 KWh
- Energy utilised from the KSEB supply – 11600 KWh

Using the full establishment capacity of the solar power plant, the college generates 32850 KWh that is apparently 90KWh /day. About 15.9% of the total energy requirement is met with this power generation using renewable energy source.

Other than this, the biogas plant installed in the campus generates about 288kg of biogas that is being utilised in the campus itself. This reduces the total cost of their cooking gas expenditure to about Rs. 30000 during the year 2018-19.

It is a good practice and model for the campus community to aim at generating the required power and cooking gas inside the campus itself by using renewable energy sources.

4.4.3.2. Findings

- Electricity charges – Rs.142392.5/month.
- Number of gas cylinders used – Rs. 77.5/month.
- Cost of Gas cylinders used – Rs. 520800/year (Rs.560/cylinders).
- Monthly amount paid for electricity and gas – Rs. 185792.5 (2016).
- Average monthly amount paid for electricity during the last three years – Rs. 108963.2
- Change in energy cost per month from 2016 = Rs. -33429. 28
- Cost of generator fuel – Rs.1000/month.
- Biogas generated per month = 24kg (288 kg during 2018-19 which is equivalent to 20 cylinders of cooking gas).
- Energy generated by the biogas plant per month = equivalent to 1.5 LPG cylinders.
- With the establishment of solar power plant the campus management could reduce the dependency on public electricity supply and the cost has come down to 108963.2. This enabled them to save about Rs. 33429.28 per month.

Table-9 Nonth wise Energy Consumption in KWh

Sl. No	Name of the Instrument	Energy Consumption, kWh/month
1	Heating Mantle	12.65
2	Power Supply	52.27
3	Uv-Disinfection System	89.10
4	Magnetic Stirrer	20.90
5	Function Generator	4.95

6	Fridge	33.00
7	Fume Exhaust Hood	158.40
8	Exhaust Fan	69.30
9	Centrifuge	30.36
10	Mixer Grinder	165.00
11	Stabilizer	27.50
12	Conductivity Meter	2.20
13	Digital Potentiometer	1.32
14	Furnace	132.00
15	Network Switch	1.32
16	Weighing Balance	0.44
17	Incubator	6.60
18	Photoelectic Colorimeter	0.66
19	Concentric Rig Bath	16.50
20	Distill Unit	33.00
21	Electric Kettle	22.00
22	Electro Microscope	1.10
23	Laminar Air Flow	11.00
24	Mixer	5.50
25	Ph Meter	0.22
26	Pump	7.70
27	Rota Evaporator	16.50
28	Uv Spectrophotometer	5.50
29	Computer	3493.60
30	Hot Air Owen	22.00
31	Iron Box	22.00
32	Oven	132.00
33	Hot Air Oven	11.00
34	Induction Cooker	1.65
35	Water Bath	11.00
36	Wax Bath	3.30
37	Lcd Tv	69.30
38	Cooler	220.00
39	Freezer	44.00
40	Inverter	0.49
41	Ups	0.01
42	Fan	4895.00
43	Tube	704.00
44	Led	334.62
45	Led Tube	300.96
46	Cfl	81.31
47	Speaker	2.64
48	Projector	165.00
49	Ac	550.00
50	Bulb	63.36

51	Printer	24.20
52	Amplifer	88.00
53	Wifi Modem	5.54
54	Photocopier	27.50
55	Aquarium	52.80
56	Scanner	0.17
57	Barcode Reader	0.22
58	Electric Bell	0.09
59	Server	132.00
60	Blue Ray Player	0.02
61	Coffee Machine	110.00
62	Duplicator	5500.00
63	I Mac	2.75
64	Washing Machine	2.20
65	Treadmill	110.00
66	Server Unit	33.00
67	Tailoring Machine	8.80

Out of 1648 lighting fixtures, there are 1087 LED based lights, which is a positive step taken towards the conservation of energy. In spite of a sylvan campus, there are 890 fans which consumes about 4895 units per month. This can be controlled by enhancing natural air circulation via proper ventilation. There are 397 full-fledged PCs which require about 3493 units of electricity for their operation. The water distribution system of the campus is a well-designed one. The water tanks kept in optimum locations, resulting in minimum energy wastage. There is a functional biogas plant, inside the campus, which aids in saving few LPG cylinders used for cooking/heating.

Monthly Energy Utilization by Different appliences in the campus	
Item	**Total Energy in KWh**
Bulb	1507.44
CFL Bulb	813.12
Fans	7832
Air conditioners	4785

Other Cooling apparatus	675
Computers	10917.5
Photocopier machines	82.5
Inverters	1584
TV	283.5
Total	**28480.1**

4.4.4. Carbon Footprint Audit

The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent

greenhouse gas, comprising 402 ppm of the Earth's atmosphere. Each human being is contributing towards adding green-house gases to the atmosphere depending upon his day to day activities and usage of instruments and machineries for different purpose.

Release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon footprint. An understanding about the same of any institute where large number of anthropogenic activities are happening is important to assess the contribution of emission of gases that are responsible for Green House Effect. Auditing for carbon footprint of Nirmala College Campus was done using a detailed questionnaire, so that the impact of the community on global environment can be assessed.

4.4.4.1. Major Findings

1. Total number of Students – 2682
2. Total number of Teachers – 143
3. Number of non-teaching staff – 20
4. Number of persons using cars - 27 (30L fuel per day)
5. Number of persons using two wheelers - 104 (50L fuel per day)
6. Number of persons using public transport – 1539, 21 km per day, average (180 L of fossil fuel per day)

7. Number of cycles used in the campus– 0
8. LPG usage - 77.5 Cylinders per month
9. Total fossil fuel usage per day - 260 L, apart from LPG and fuel for generators

It is evident that majority of the campus community are relying on public transport system for commutation leading to the expense of 180 L of fuel per day. This shall be considered as a very conservative approach. Assuming that 20 persons travel together combined with number of motorcycles and cars lead to the usage of 260L of fuel per day. This causes the emission of about 702kg of CO_2 per day. This measurement is excluding the natural emission of Co_2 by human by breathing (ie. 1140g/day). Consumption of one litre LPG releases about 1.5kg of CO_2. At the rate of 77.5 cylinders per month the college is using about 1085 L of LPG that releases 1627.5kg CO_2 per month. Since there is no data from similar institution available a comparison of carbon footprint is not attempted.

Chapter – 5
Recommendations

5.1.General recommendations

1. All the lists of plants shall be uploaded in the college site.
2. A file shall be maintained to assess and analyse the usage of garden by different stakeholders.
3. There shall be a digital platform where students and staff shall get details about plants and animals in the campus. This may include name, information of systematic position as per standard classifications, usage, value, further references, etc.
4. The name boards shall be updated with QR code technology that enable the students and staff to scan the QR code to access relevant information of the taxa.
5. There shall be a discussion forum in the campus where a discussion on green activites is possible by students, alumni, staff, etc. and the moderator of the group shall update the information in the digital repository accordingly.
6. Students and staff shall take initiative to start live campus discussion groups where green conservation and awareness shall be the main agenda.
7. The deliberations shall be shared among students and other stakeholders through campus/social media.

5.2. Water Management

1. Strengthening awareness on water conservation among student and teacher communities.
2. Observe 'world water day' on March 22nd with different programmes (cycle rally, street play, flash-mob, poster, elocution etc. can be conducted).
3. Apply for *Bhoomithrasena* club (This is an initiative of Directorate of Environment and Climate Change, Govt. of Kerala) to get financial assistance.
4. 'Save Water' posters to be affixed in the classrooms, hand washing areas.
5. Repair water leaks and leaky toilets immediately.

6. Install water aerators and automatic shut-off devices on faucets.
7. Use low-flow shower heads and timer shut-off devices with automatic sensors to reduce water use during showers.
8. Bring a water bottle to college. At the end of the day, any leftover can be poured onto the garden.
9. Set up an efficient water recycling system in the college canteen.
10. Install more rain water harvesting systems.
11. Install waste water system for chemistry labs.
12. Use green solvents and green methods (e.g., double burette titration) in the chemical laboratories.

3.5. Energy Management

1. The on grid solar power plant can bring down electricity costs and might prove to bring in financial benefits in the long run. Being at a relatively high lying area of the town, there would be no issues with sunshine, particularly in summer.
2. Gradual replacement of existing non LED based lights to LEDs can further bring down costs for lighting.
3. Replacement of existing electric fans with BLDC fans can significantly reduce power consumption and help in a good reduction in electricity charges.
4. Instead of using desktop workstations, we could consider desktop virtualization, wherever possible which could lead to reduced power consumption and reduced power costs.

5.4 Carbon Footprint

1. Operate a college bus, with an optimal route planning, could reduce fossil fuel consumption.
2. Encourage the use of bicycles and public transport system by the community, particularly the student community.
3. Planting of trees to negate the effect of burning of fossil fuels.
4. Carpooling, wherever possible, particularly by those who are using cars should be encouraged.

Chapter – 6
Future Action Plans

1. Year wise internal audit on green, water and energy to be conducted by respected teachers.
2. Proper management and month wise mapping of water and energy usage to be conducted by monitoring the same in the records.
3. Department wise awareness programs to be organised by department staff representative to each committee.
4. Proper waste water management
5. Proper monitoring and disposal of waste discharge from chemical laboratories
6. Implementation of sign boards and indications of water and energy usage.
7. Energy maintenance by proper usage of electrical appliances.
8. A timber garden and museum to be implemented
9. Vegetable and agriculture crop planting has to be increased using advanced technologies.
10. Promotion of visit to agriculture farm lands and processing centres.
11. Marketing of vegetables and crops cultivated in the campus.

The students and staff who are active in green related activities have a clear vision about how and what should be planned for a greener campus. They think that planting of more saplings during the world environment day would cater more awareness and enthusiasm in students who join afresh each year. The college is also planning to initiate plant a tree/adopt a tree program where each student will be planting a sapling and taking care of it during his or her stay in the college. Although the college follow a university curriculum by implementing several such awareness program in their academic and non-academic activities promote more students turn to green activities.

6.1. Conclusions

1. The management and other authorities are keen to make the campus a green campus
2. Nirmala College is making learning process by practical approach. This is fulfilled by setting different types of gardens, arboretum concept based garden and conservation of water and energy.
3. Staff and students are aware about the commitment of the institute towards the society.
4. Green audit at times makes the campus authority to understand the effect of implications towards greenness and conservation of water and energy.
5. The evaluation process proved that the authorities have applied implications suggested in the previous audit.
6. The campus community functions are oriented with an eco-friendly approach that enables the student community to develop a genuine approach on conservation of nature, and natural resources.
7. The results presented in the present report would be helpful for the authorities to make future action plans to develop more sophisticated ideas in bringing more values in future efforts towards conservation of biodiversity, water and energy.
8. We, the Heartian Green Audit team, submitting the comprehensive audit report to the authorities of Nirmala College Campus. We hope the audit finding would help them implement better management plan to achieve a complete green campus, save maximum water and energy for a better future.

We suggest the college management to conduct the next audit after three years, ie. March 2021. This would help them understand whether they are heading forward by achieving the set forth plans and goals.

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Plate I

Plate I. A. The campus of Nirmala College from entry point.

Plate I. B. Another view of the campus of Nirmala College from entry point in front of the Library

Plate II

Plate II. A. An aerial of Nirmala College campus.

Plate II. B. Another view evidentialy indicating the attempt to make the campus green

Plate III

Plate III. A. Students carrying our experiments and practicals in the arboreatum

Plate III. B. Students are involved in learning process using the resources in the medicinal plant garden

Plate IV

Plate IV. A. A view of Agriculture garden where vegetables are maintained.

Plate IV. A. Students are involved in watering and maintaining the campus garden

Plate V

Plate V. A. The Solar Power plants installed in Nirmala College.

Plate V. B Students and teachers inspecting the Solar Power plants installed in Nirmala College.

Plate V

Plate V. A. The Green Audit visiting Nirmala College Arboretum.

Plate V. B The Green Audit team with the internal supporting members.

Annexure – I

Green auditing of Nirmala College, Muvattupuzha

Auditing for Green campus management

1. Is there a garden in your college? Area?

2. Is there concept based garden (star plants, medicinal plants, endemic species, agriculture, etc.), specify area for each.

3. Do students spend time in the garden? If so, approximate time and purpose. (Lists with priority Annexure-I).

4. List the plants (scientific names, Family, etc.) in the garden, with approx. numbers of each species (Annexure-II).

5. List of campus flora (attach a list of plants with details, including scientific name, family, approximate number of plants, etc.) in your campus

6. Name and number of the medicinal plants in your college campus.

7. Any threatened plant species planted/conserved (provide a list with their threat status).

8. List the plants to be planted on your campus in the next three years. **(Trees, vegetables, herbs, etc.)**

9. List the species planted by the students, with numbers (Annexure –III).

10. Have you got any external funding for developing gardens in the campus? If yes, year, agency, and amount of funding.

11. Explain how you utilized funds for gardens.

12. Whether you have displayed scientific names of the plants in the Campus?

13. What are the vegetables cultivated in your vegetable garden? (Mention the quantity of harvest in each season).

14. How much water is used in the vegetable garden and other gardens?

15. Mention the source and quantity of water used (per month).

16. Are you using any type of recycled water in your garden?

17. Who is in charge of gardens in your college?

18. Is there any permanent staff to look after gardens in the campus?

19. List the name and quantity of pesticides and fertilizers used in your gardens?

20. Are you doing any organic practice in your campus? List them?

21. Do you have any composting pit (specify what compost) in your college? If yes, what you do with the compost generated?

22. Do you have a vegetable garden on the campus?

23. If yes, how the harvested vegetables are utilized? Do you have any market in the campus?

24. Is there a nature club in your college? If yes what are the activities?

25. Is there any arboretum in your college? If yes details of the trees planted.

26. Is there any fruit yielding plants in your college? If yes details of the trees planted.

27. Is there any groves in your college? If yes details of the trees planted.

28. Is there any irrigation system in your college?

29. What is the type of vegetation in the surrounding area of the college?

30. What are the nature awareness programs conducted in the campus? (2014-19). Provide a list (annexure-IV)

31. What are the involvement of students in the green cover maintenance?
Planting saplings and maintenance

32. What is the total area of the campus under tree cover? Or under tree canopy?

33. Share your future plans for further improvement of green cover.

34. Have you incorporated green conservation aspects in your curriculum?

35. How often you conduct public programs on green conservation?

36. Do students reach out to the public in conveying the message of nature conservation?

Annexure – II

Green Auditing of Nirmala College, Muvattupuzha

Questionnaire for Water Management Auditing

1. What is the total Area of the campus?
2. Number of total teachers, non- teaching staff and students in the campus.
3. Provide a list with different uses of water in the campus (Annexure 2-I).
4. Name different sources of water in your college?
5. How many wells are there in your college?
6. Number of electric motors used for pumping water from each well?
7. What is the total horse power of each motor?
8. What is the depth of each well?
9. What is the present depth of water in each well?
10. How does your college store water?
11. Capacity of the overhead water tank/s in the campus? (in litres)
12. Quantity of water pumped every day? (in litres)
13. How do you justify that the water usage is judicious in the campus?

14. Is there any water wastage? If yes, specify why and how.
15. Is there any mechanism to identify water wastage in the campus, explain (Annexure 2-II)
16. What are the possible ways to check wastage of water?
17. Is there any waste water generation happening in the campus?
18. What are the possible sources of waste water in the campus?
19. Where does the waste water go?
20. Are you reusing the waste water after recycling it?

21. What are the systems of management of water used in your labs, especially Chemistry lab (or labs where experiments are happening involving chemicals)?
22. Does this water get mixed with ground water?
23. Is there any treatment for the lab water after usage?
24. Is there a system of practice of green chemistry in your campus? Give details.

25. Write down four ways that could reduce the amount of water used in your college.

26. Record of water use from the college water meter for six months.
27. Amount, if any, as charges towards water paid for water connections.
28. Number of water coolers in the campus. Amount of water used per day? (in litres)
29. Number of water purifiers in the campus, if any.
30. Number of water taps in the campus. Amount of water used per day?
31. Number of bath rooms and toilets separately for staff rooms, common, hostels (Annexure 2- III).
32. Number of toilets?
33. Amount of water used per day in the toilets?
34. Number of water taps in the canteen. Amount of water used per day?
35. Amount of fire-wood used in the canteen kitchens?
36. How much ash collected after burning fire wood per day in the canteen?
37. Amount of water used per day for irrigation purpose.
38. Number of water taps in laboratories. Amount of water used per day in each lab?
39. Number of taps in hostels.
40. Total use of water in each hostel?
41. Provide a list of month wise water usage in different areas in the campus
42. Is there any water used for agricultural purposes?
43. Is there any rain water harvest system in the campus? If yes, details of the storage capacity?
44. Report on the status of their functioning.
45. Provide number of damaged taps in the campus? Amount of water lost due to damaged taps or water supply system per day?
46. How do you convey the message of water conservation in the campus?
47. How many water fountains are there? _____

48. How often the garden is getting irrigated?
49. Amount of water used to water the ground?
50. Amount of water used for college bus cleaning? (litres per day)
51. Is there any other way by which water is being utilized?.
52. Area of the college land which is under concrete tiles.
53. Is there any future plan for the water management in the campus?
54. Are there any water saving techniques followed in your college? Explain?
55. Is there any mechanism by which message on water conservation is been conveyed to staff and students.

Annexure – III

Green auditing of Nirmala College, Muvattupuzha

Questionnaire for Energy Management Audit

1. List out ways of energy usage in the campus. (Electricity electric stove, kettle, microwave, incinerator; LPG, firewood, Petrol, diesel and others).
2. Electricity bill amount for the last three years.
3. Amount paid for LPG cylinders for last three years.
4. Any other payments towards energy related matters for last three years in the campus
5. Weight of firewood used per month and amount of money spent? Also mention the amount spent for petrol/diesel/others, if any?
6. Are there any energy saving methods employed in your college? If yes, please specify.
7. What are the types of bulbs used in the campus?
8. Provide a list of number of bulbs of each types.
9. Provide the total energy utilization by each types of bulb per month.
10. How many CFL bulbs has your college installed? Mention use (Hours used/day for how many days in a month)
11. Energy used by each bulb per month? (For example- 60 watt bulb x 4 hours x number of bulbs = kWh).
12. How many LED bulbs has your college installed? Mention use (Hours used/day for how many days in a month)
13. How many incandescent (tungsten) bulbs has your college installed? Mentions use (Hours used/day for how many days in a month)
14. How many fans installed in the campus? Mention use (Hours used/day for how many days in a month)
15. Energy used by all fans per month? (kwh)
16. How many air conditioners are in use in the campus? Mention time of their usage (Hours used/day for how many days in a month).
17. Energy used by all air conditioners per month? (kwh).
18. How many electrical equipments including weighing balance used in the campus? Mention use (Hours used/day for how many days in a month)
19. Energy used by each such electrical equipment per month? (kwh).
20. How many computers were in use in the campus? Mention the energy use. (Hours used/day for how many days in a month)
21. Energy usage by all computers per month? (kwh)

22. How many photocopier machines are installed and in use at present in the campus? Mention use (Hours used/day for how many days in a month).
23. Energy used by all photocopier per month? (kwh) Mention use (Hours used/day for how many days in a month)
24. How many cooling apparatus present in the campus? Mention use (Hours used/day for how many days in a month)
25. Energy used by all cooling apparatus per month? (kwh) Mention use (Hours used/day for how many days in a month).
26. How many inverters your college installed? Mentions use (Hours used/day for how many days in a month)
27. Energy used by each inverter per month? (kwh)
28. How many electrical equipment used in different labs (methods that are not included in the above calculations) in the campus? Mentions use (Hours used/day for how many days in a month)
29. How many electrical equipments are available in all labs in the campus?
30. Energy used by all equipments together per month? (kwh)
31. How many heaters used in the canteen of your college? Mention their use (Hours used/day for how many days in a month)
32. Energy used by each heater per month? (kwh)
33. Number of street lights in your college?
34. Energy used by all street lights per month? (kwh)
35. Number of televisions in your college and hostels?
36. Energy used by all TVs per month? (kwh)
37. Any other items that uses energy (Please write the energy used per month) Mention the application (Hours used/day for how many days in a month)
38. Does the camp us have any alternative energy sources/nonconventional energy sources? (photovoltaic cells for solar energy, windmill, energy efficient stoves, etc.,) Specify.
39. Do you run “switch off” drills at college?
40. Are your computers and other equipment put on power-saving mode?
41. Does your machinery (TV, AC, Computer, weighing balance, printers, etc.) run on standby modes most of the time? If yes, how many hours?
42. What are the energy conservation methods adapted by your college?
43. Is there any public awareness systems informing necessity of energy conservation in the campus?
44. Write a note on the methods/practices/adaptations by which you can reduce the energy use in your college campus in future.

Green Auditing of Nirmala College, Muvattupuzha

Questionnaire for Carbon footprint Auditing

1. Total number of students and teachers in your College?

Gender	No of students	No of Teachers	No of non-teaching staff
Male			
Female			
Transgender			
Total			

2. Total Number of vehicles used by the stakeholders of the college/per day.

3. No. of cycles used/day in the campus.

4. No. of two wheelers used (average distance travelled, cc of two wheelers and quantity of fuel and amount used/day). (C.F-Annexure-I).

5. No. of cars used (average distance travelled, power of engine (cc) and quantity of fuel and amount used/day). (C.F-Annexure-II).

6. No. persons using common (public) transportation (average distance travelled and quantity of fuel and amount used/day).

7. No. of persons using college conveyance (general transportation) by the students, non-teaching staff and teachers (average distance travelled and quantity of fuel and amount used per day)

8. Number of parent-teacher meetings in a year? Parents turned up (approx.)

9. Mention their mode of travel and give approximate cost of their commutation.

10. Number of visitors with vehicles per day?

11. Number of generators used/day (hours). Provide quantity and amount for fuel usage/day.

12. Number of LPG cylinders used in the campus. Provide quantity and amount of fuel used /day.

13. Quantity of kerosene used in the canteen/labs (Provide quantity and amount of fuel used per day and amount spent).

14. Amount of taxi/auto charges paid and the amount of fuel used per month for the transportation of vegetables and other materials to the campus.

15. Amount of taxi/auto charges paid per month for the transportation of office goods to the college.

16. Amount of taxi/auto charges paid per month by the stakeholders of the college.

17. Use of any other fossil fuels in the college (Give the amount of fuel used per day and amount spent). (C.F-Annexure-III).

18. What are the methods you might adopt in the future to reduce the quantity of fuel used by the stakeholders/students/teachers/non-teaching staff of the college.

Audited by

SH SACRED HEART COLLEGE Autonomous

Heartian Green Audit Team

Sacred Heart College Thevara

Cochin-13

NIRMALA COLLEGE
MUVATTUPUZHA

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