



## Criterion I

### Curricular Aspects

#### 1.3 Curriculum Enrichment

##### 1.3.3 Number of students undertaking project work /field work/internship

# Project Reports

# Arts Project Reports

नाव :-  
कु. शिवानी राजेबा ठोमके

कॉलेजचे नाव :-  
जयसिंगपूर कॉलेज, जयसिंगपूर

रोल नं :- **B.A. - III**  
34

विषयाचे नाव :-  
नियोजनाचे अर्थशास्त्र

PRN No :-  
2018091931

Phone  
28. P.T. Manje

**2020-2021**

# B.A.-III ECON.

कॉलेजचे नाव -

जयलिंगपूर कॉलेज  
जयलिंगपूर

नाव -

कल्याणी योगिता संजय

रोल नं. -

०१

विषयाचे नाव -

आर्थिक विचारसंचा इतिहास

PRN NO - 2018052746

Year

2020 - 2021

P. Mani

प्रा. डॉ. प्रभाकर माने

B.A. - III Econ.

कॉलेजचे नाव - जयलिंगपूर कॉलेज  
जयलिंगपूर

नाव - कल्याणी योगिता संजय

शेल नं. - 01

विषयाचे नाव - नियोजनाचे अर्थशास्त्र

PRN NO - 2018052746

2020-2021

Phone  
फोन  
प्रा. सौ. खाली मांडा

# Commerce Project Reports

A  
PROJECT REPORT  
On

"A COMPARATIVE STUDY OF FINANCIAL MANAGEMENT OF  
COMPUTER EDUCATION INSTITUTES"

With Special Reference to  
WIN INFOTECH & PERFECT COMPUTER

Submitted To  
SHIVAJI UNIVERSITY, KOLHAPUR

For the degree of  
MASTER OF COMMERCE

Submitted by  
Miss. Anuradha Avinash Kalekar

Under the Guidance of  
Dr. N.L. Kadam  
(M.com. M.Phil. Ph.D. M.B.A)

Through  
THE PRINCIPAL  
ANEKANT EDUCATION SOCIETY'S  
JAYSINGPUR COLLEGE, JAYSINGPUR.

2020-2021

Seen

~~7/2/21~~  
23/09/21.

Ref no.

## CERTIFICATE

This is to certify that,

Miss. Anuradha Avinash Kalekar M.com- II student from "Jaysingpur College Jaysingpur". She has completed a project report in our title name "A Comparative study of financial management of computer education institutes with special reference to win infotech & perfect computer". For the academic year 2020-2021.

During the project work she has collected the necessary information for her studies and analysis she is found to be sincere and hard working. We wish her for a brighter future ahead.

Date: 27-03-2021

Place: Jaysingpur

Managing director

Win infotech, jaysingpur



A  
PROJECT REPORT ON

**"A STUDY ON CUSTOMER SATISFACTION OF 'HOTEL GURUDATTA',  
NARSOBAWADI"**

SUBMITTED TO,  
**SHIVAJI UNIVERSITY, KOLHAPUR.**

FOR AN AWARD OF THE DEGREE  
MASTER OF COMMERCE

SUBMITTED BY  
**MR. ADITYA ASHOK CHORAGE**

UNDER THE GUIDANCE OF

**Dr. N.L.KADAM**

(M.Com, MBA, M. Phil, PH. D.)

THROUGH

THE PRINCIPAL OF  
ANEKANT EDUCATION SOCIETY'S



**JAYSINGPUR COLLEGE, JAYSINGPUR.**

**2020-2021**

Seen  
T. P. S. R. →  
28/4/21.





## GURUDATTA ENTERPRISES

**GURUDATTA**  
Hotel, Narsobawadi.

**GURUDATTA**  
Yatri Niwas, Narsobawadi.

301, Tejas Heights, Opp. Slon Hospital, Plot No.-245, Slon (east), MUMBAI-400022, Contact No. 91-22-24081454

Ref. No.

Date: 27/03/2021

### Certificate

*This is to certify that Mr. Aditya Ashok Chorage, students of **Master of Commerce** at Jaysingpur College Jaysingpur, has completed his project work entitled with "**STUDY ON CUSTOMER SATISFACTION OF HOTEL GURUDATTA.**" In our organization during the year 2020-21*

*He has made sincere efforts & taken keen interest to collect data & in knowing various matters related to his project work.*

  
**Gurudatta Hotel**  
At & Post Narsobawadi  
Dist. Kolhapur-416 104.

A  
Project Report  
on  
"A Study of Cost Sheet Analysis"

With Special Reference to

**Ghodawat Foods International Private Limited Chipri.**

Submitted To

**Shivaji University Kolhapur**

For an hour of Postgraduate Degree of

**Master of Commerce**

Submitted by,

**Miss. Gayatri Akaram Kamble.**

Under the guidance of

**Dr.N L. Kadam.**

(M.COM, M.PHIL, PHD, MBA)

Through the principal,

**Jaysingpur College, Jaysingpur.**

From The Year 2020 to 2021.

Signature  
Principal  
G. S. Kamble



Enhancing  
Lives  
Globally



Date-03.03.2021

**To Whomsoever It may Concern**

This is to certify that Miss. Gayatri Akaram Kamble Student of M.Com .II year from Jaysingpur College, Jaysingpur has Successfully Completed her Training Project regarding "a Study of Cost Sheet Analysis " during her visit between 01.02.2021 to 01.03.2021.

During this period of Project work, she was found to be sincere punctual & hard Working

We wish all the best for her future endeavors.

For, Ghodawat Foods International Pvt. Ltd.

Authorized Signature



**GHODAWAT FOODS INTERNATIONAL PVT. LTD.**

Corporate Off. Plot No. 437, P.B. No. 118, Jaysingpur - 418101, Dist. Kolhapur, Maharashtra, India

T: +91-2322-25575152 F: +91-2322-2559862/255662

E: [hr@godawat.com](mailto:hr@godawat.com) W: [www.godawat.com](http://www.godawat.com)

Factory : Dist No 394, AP : Chipli, Tal Shirai, Dist : Kolhapur, Maharashtra, India



## JAYSINGPUR COLLEGE, JAYSINGPUR

MASTER OF COMMERCE

"A STUDY OF PERFORMANCE EVALUATION OF DR.  
APPASAHEB URF SA.RE.PATIL JAYSINGPUR UDGAON  
CO-OPERATIVE BANK LIMITED IN  
AGRICULTURE FINANCE"

SUBMITTED TO

SHIVAJI UNIVERSITY, KOLHAPUR

SUBMITTED BY

MISS. SONALI BABAN KALLOLE

UNDER THE GUIDANCE OF

DR.N.L.KADAM

M.COM, M.PHIL, Ph.D. MBA (EXECUTIVE)

2020-2021

(30/08)  
7/2/2021  
23/09/21



डॉ. आप्पासाहेब उर्फ सा. रे. पाटील जयसिंगपूर-उदगांव सहकारी बँक लि., जयसिंगपूर.  
**Dr. Appasaheb Urf. Sa. Re. Patil**  
**Jaysingpur Udgaon Sahakari Bank Ltd., Jaysingpur**

Head Office - JAYSINGPUR-416101, Dist. Kolhapur. (MAH.)  
Ph.: 02322-224588 Fax : 02322-225277  
Website : www.jusbbank.com Email : jusbho.jaysingpur@rediffmail.com

Reg. No. : HO/2020-21/1281

Date : 26/03/2021

### CERTIFICATE

This is to certificate that Miss Sonali Baban kallole student of Mcom 2<sup>nd</sup> Jaysingpur Collage Jaysingpur has successfully complited her project work titled A STUDY OF PERFORMANCE EVALUATION OF DR APPASAHEB URF SA RE PATIL JAYSINGPUR UDGAON SAH BANK LTD JAYSINGPUR IN AGRICULTURE FINANCE in our organization a during her project work she has shown keen intrest and found to be sincere and hard working.

We wish every success in her future endeavour.

Date

Place

GENERAL MANAGER



Anekant Education Society's  
**Jaysingpur College, Jaysingpur**  
**Department of Commerce**  
**Class- M. Com. II**  
**Sub- Advanced Accountancy Paper VIII**  
**(Research Methodology)**  
**Academic Year-2020-21**

Sr.	Seat No.	Name of the student	Title of the Project	Guide name
1	12362	Miss. KumthekarBhagyashriAravind	A Comparative Study of Advances Bharat Urban Co-Operative Bank Ltd. &NandaniSahkari Bank Ltd. Nandani.	Dr. N. L. Kadam
2	12390	Miss. Vadar Manisha Bharat	A Study of Income and Expenditure of Garment Industry with special reference of Kimaya Garment Industry, Jaysingpur	Miss. A. J. Kamble
3	12392	Miss. AishwaryaPitambarVhanmore	A Study of Cost Sheet with Special Reference of Swabhimani Agro Products Producer Co. Ltd Udgoan.	Dr. N. L. Kadam
4	12336	Miss. Susmita Ramesh Chavan	A Study of Changed Buying Behaviour in the COVID-19 pandemic – The influence of Price Sensitivity and Perceived Quality	Mrs. S. S. Chougule
5	12371	Miss. Panadare Ashwini Sanjay	A Comparative Study of Sales Performance of Balaji Honda Showroom Dattwad and Parshwa Honda, Kurundwad	Mrs. S. S. Chougule
6	12351	Miss. KallannawarPritiRajendra	A Study of Cost Sheet With Special Reference to Swabhimani Agro Products Producer Co. Ltd.Jaysingpur	Mrs. S. S. Chougule
7	12356	Miss. Khatavkar Suman Mahadev	A Study of Cash Flow Statement With Special Reference to Shreem Electric Ltd.	Mrs. S. S. Chougule
8	12359	Miss. KothaliAnkitaShridhar	A Study of Investment in Life Insurance Policies by the Individual Residing At Akiwat Village. Tal. Shirol .	Dr.N.L.Kadam
9	12345	Miss. Jagdale Seema Vijayrao	A Study of Cash Flow Statement With Special Reference To Ban k Of Maharashtra.	Dr.N.L.Kadam
10	12358	Miss. Kore AratiSubhash	A Study of Working Capital Management with reference to Vijay KrushiSeva Kendra, Takawade.	Dr. N. L. Kadam
11	12363	Miss. KupwadeAshwetaDhanpal	A Study of Working Capital Management with Special Reference to Aditya Instruments, Ichalkaranji.	Dr. N. L. Kadam
12	12343	Miss. HerwadeRutujaBabaso	An Analysis And Interpretation of Financial Statement of SwatantraSenani Kai. ShripalAlase (Kaka),Kurundwad Urban Co-operative bank Ltd. Kurundwad	Dr. N. L. Kadam
13	12357	Miss. Khilare Pooja Jaypal	A Study of The Gold Loan of Shri. Bharat Urban Co.Operative Bank Ltd Jaysingpur.	Mrs. S. S. Chougule
14	12330	Miss. Attar Afrin Sikandar	A Study Of Production Management Of Control Panel With Special Reference To Eepsit Enterprises Pvt Ltd Kupwad.	Miss.A.J.Kamble

15	12360	Miss.KumbharPallaviShrikant	A Study of Production Management of Greenhouse With Special Reference To Shrivardhan Bio-tech CO. Ltd. Kondigre.	Miss.A.J.Kamble
16	12338	Miss. Chougule RutujaAravind	A Study of Human Resource Management in KarmveerBhauraoPatilNagariSahakariPatsantha ,Sangli.	Mrs.S.S.Chougule
17	12352	Miss.KaloleSonaliBaban	A Study Of Perormance Evaluation Of Dr.Appasahebursa.re.patiljaysingpurUdgaon Co-operative Bank Ltd in Ageiculture Finance	Mrs.S.S.Chougule
18	12376	PatilDeepika Prakash	A Study of Raising and Utilization of Funds with Special Reference to Shree DattaShetkariSahakariSakharKarkhana Ltd., Shirol	Mrs.S.S.Chougule
19	12383	Miss. Patil Shweta Surgonda	Liquidity management With Special Reference To DoodhgangaGraminBigarShetkariSah. Pat Sanstha, Dattawad	Mrs.S.S.Chougule
20	12379	Miss. PatilNilimaNeminath	A Study Of Management Of Greenhouse Special Reference To Raviraj Greenhouse, Samdoli	Dr. N. L. Kadam
21	12375	Miss. Patil Archana Rajgonda	A Cost Analysis Of Milk & Milk Products of “ The Kolhapur District Co-operative Milk Producers Union Ltd., Kolhapur” (Gokul Dairy)	Dr. N. L. Kadam
22	12349	Miss. KagalePavitraLaxman	A Study Of Consumer Behaviour Towards star refined oil in Jaysingpur	Dr. N. L. Kadam
23	12342	Miss. GorwadeVarshaRajendra	A Study of Marginal Costing With Special Reference To The Ichalkaranji Co- Operative Spinning Mills Ltd; Ichalkaranji.	Mrs. S. S. Chougule
24	12385	Miss. SanabeSmitaBalaso	A Study of Sales & Profit of Agricultural Instrument Trading Organisation with Special Reference To Bharat Tractors, & Motors Shirol.	Miss. A. J. Kamble
25	12333	Miss. Bandar JannatbiShoukat	A Study On Motivational Techniques Implemented By “Star Rice Mill” , Hatakanagle With Special Reference To Ghodawat Foods International Pvt Ltd. Chipri Jaysingpur	Mrs. S. S. Chougule
26	12378	Miss. Patil Manisha Ashok	A Study Of Fund Flow Statement With Special Reference To Shree. DattaShetkariSahkari SakharKarkhanaShirol	Miss. A. J. Kamble
27	12346	Miss. Jamadar TaiyabaHaidar	A Study on Investment In Mutual Funds With Special Referances To Kurundwad Town	Mrs.S.S.Chougule
28	12388	Miss. SungarPournima Manohar	A Study of Sales To Selected Coco Cola Beverages in Kurundwad City	Mrs.S.S.Chougule
29	12340	Miss. Gaikwad Manisha Namdev	A Study Of Production Management Of Greenhouse With Special Reference To ShrivardhanBiotect , Kondigre	Mrs.S.S.Chougule
30	12353	MISS. GAYATRI AKARAM KAMBLE	A study of cost sheet analysis with special refrence to Ghodawat foods international pvt.ltd.chipri.s	Dr. N. L. Kadam
31	12350	Miss.anuradhaavinashkalekar	A Comparative Study Of Financial Management Of Computer Eduction Institutes With Special Reference To Win Infotech And Perfect Computer Jaysingpur .	Dr.N.L.Kadam
32	12377	Miss. PatilKomalRavso	A Study of Various Types of Loans and Deposite in Credit Society with Special Reference of “KarmveerBhauraoPatil Multistate Co.Operative Credit Society Ltd.”	Dr.N.L.Kadam
33	12339	Mr. ChudmungeAvinash Prakash	A Study of Cost Sheet Analysis with Special Reference to PMK Energy Private Limited , Jaysingpur	Dr.N.L.Kadam
34	12365	Mr. Magrai Irfan Rahemansab	A Study Of Technical Analysis On Banking Sector With Reference To Profitmart Securities Pvt., Ltd.	Mrs. S. S. Chougule

35	12364	Miss.KuradeBhagyashriBhupal	Administration of Computer Education Private Institutes : A Study of Jaysingpur City.	Dr. N. L. Kadam
36	12366	Miss. Mali Manisha Balaso	A Study of Finance to Industrial Sector by NandaniCo.Operative Bank.	Mrs. S. S. Chougule
37	12355	Miss. KhadakoleRajashree Ramachandra	Awareness of Investment in Equity Shares of Limited Company and Individual Online Trading : A Study of Investors from Jaysingpur City ( with special reference to Angel Broking , Jaysingpur)	Dr. N. L. Kadam
38	12347	Miss. JangateAishwaryaSiddhu	Awareness and Investment in Mutual Funds by Rural Investors : A Study of the Village Nandani.	Dr. N. L. Kadam
39	12373	Miss. PatilAishwarya Ramesh	A Study of Expenditure on Purchase of Mobile and Recharge of the Residents of Takali, Tal-Shirol.	Miss.A.J.Kamble
40	12370	Miss. GulafshaShajajanNadaf	A Study of Pathsanstha loan in advance wirt reference to 'LoknagarisahakaripathsasnthaKupwad Ltd.	Miss.A.J.Kamble
41	12374	Miss. PatilAmrutaRajendra	Study Of Deposits Loan Schemes Of The Kurundwad Urban Co-Operative Bank Ltd., Kurundwad. Branch-Khidrapur	Mrs.S.S.Chougule
42	12335	Miss. ChalvadeJyotiRavindra	An Analytical Study of Insurance business with Special Reference to Life Insurance Corporation, Branch Jaysingpuer.	Mrs.S.S.Chougule
43	12348	Miss. JatharDhanashri Anil	A Study Of Financial Performance With Special Reference to Laxmi Textile Industries, Ichalkaranji.	Mrs. S. S. Chougule
44	12387	Mr.ShikareSumit Bharat	A Study of Impact of Gst on Construction Business	Dr. N. L. Kadam
45	12381	Mr. PatilPrathmeshBhaugonda	A Study Of Non –Performing Assets With Reference The Inchalkaranji Merchant Cop. Bank Ltd Inchalkaranji.	Dr.N.L.Kadam
46	12368	Mr.Mane Dipak Anil	A Study Of Capital Budgeting And Implementation With Special Reference To Shubham Engineering Works	Dr.N.L.Kadam
47	12361	Mr. KumeSanketArun	A Study of Labour Welfare Facility With Reference To "Rajdhani Books & Paper Products Pvt. Ltd."	Dr.N.L.Kadam
48	12337	Mr. Chorage Aditya Ashok	A Study on Customer Satisfaction of ' HotelGurudatta', Narsobawadi.	Dr.N.L.Kadam
49	12329	Mr. Ainapure Kiran Baburao	"Comparative Study Of Liquidity Management With Reference To JawaharSahakari Bank Ltd. ,Hupari&SwatantryaSenani Kai. ShripalAlase (Kaka) Kurundwad Urban Co.op.Bank Ltd. Kurundwad."	Mrs. S. S. Chougule
50	12384	Mr. RajmaneOnkar Sanjay	A Study Of Loans & Advances With Special Reference To Shri Bharat Urban Co-Operative Bank Ltd. Jaysingpur.	Miss.A.J.Kamble
51	12344	Mr. Jadhav Rahul Nanasahab	A Study of Scope of Hotel Management With Special Reference to Gurudatta Hotel, Narsobawadi	Dr. N. L. Kadam
52	12354	Mr. Karande Rakesh Sanjay	A Study of Production Management of Vishnu Weavetex p.v.t ltd ,Tadal	Mrs. S. S. Chougule
53	12331	Mr. Awale Anil Appasaheb	A Study Of Working Capital Process With Special Reference To Akshay Engineering Works	Mrs. S. S. Chougule
54	12369	Mr. MohiteRohitVishanu	Analytical Study Of Cost Statement Of Laxmi Cooperative Process Ltd,Ichakaranji.	Dr. N. L. Kadam
55	12386	Miss. SanadiKomalMahavir	Analysis of Financial Statement of Not For Profit Organizations.	Miss.A.J.Kamble



56	12380	Miss. Patil Poonam Sunil	An Analytical Study of Earnings of Watch Business in Jaysingpur City.	Miss. A. J. Kamble
57	12334	Miss. Banhatti Varsha Balu	A Study of Financial Analysis and Production Management of Chaitanya Packing, Jaysingpur	Miss. A. J. Kamble
58	12382	Miss. Patil Shraddha Nabgonda	A Study of Ratio Analysis And Interpretation Ahinsa Bakery Food Products , Chipri.	Dr.N.L.Kadam
59	12367	Miss. Mali Shraddha Nandkumar	A Study of Impact of GST on MSME to Local Enterprises with reference to Mahesh Jadhav & Co.	Mrs. S. S. Chougule
60	12391	Miss. Vaidya Ritu Vaibhav	A Study of E-Business Before And After COVID-19 Pandemic	Miss. A. J. Kamble
61	12372	Miss. Patil Aishwarya Anil	A Study of Inventory Management with special reference to Shahu Industrial Estate, Jaysingpur	Mrs.S.S.Chougule
62	12328	Mr. Patil Sammed Sanjivkumar	The Study of Financial Statement Analysis with Special Reference to Opal Farm Agro Chemical Pvt. Ltd., Jaysingpur	Mrs.S.S.Chougule
63	12389	Miss. Tagare Vaishali Sarjerao	Management control system of service organizations with Special Reference to Bank of Maharashtra.	Dr.N.L.Kadam
64	12332	Mr. Akib Kudartali Bagwan	A Study Of Distribution Channel Of Kulkarni Power Tools Industries Ltd.	Dr.N.L.Kadam
65	12327	Mr. Patil Dhandale Arihant Baloso	A Study of Financial Performance of The Ratnakar Bank Ltd., Branch Jaysingpur	Dr.N.L.Kadam
66	12341	Miss. Ghorpade Radhika Ranjit		Mrs. S. S. Chougule

### **Repeater Students**

1.	13254	Mr. Chinchane Mahesh Pargonda	A Study On Working Capital Management Of Prime co-op. Shoe Industries Ltd, Jaysingpur	Dr.N.L.Kadam
2.	13255	Mr. Khot Mallikarjun Maruti	A Study on retail loan system with reference to RBL Bank Ltd. Kolhapur	Mrs. S. S. Chougule

**A Project Report  
On**

**“A COMPARATIVE STUDY OF ADVANCES”**

WITH REFERENCE TO

**NANDANI SAHAKARI BANK LTD. NANDANI & SHRI BHARAT URBAN CO-  
OPERATIVE BANK LTD. NANDANI**

**SUBMITTED TO**

**“SHIVAJI UNIVERSITY”**

**IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR AWARD  
OF THE DEGREE OF**

**“MASTER OF COMMERCE” (M.Com)**

**By**

**Miss. BHAGYASHRI ARVIND KUMTHEKAR**

**Under the guidance of**

**Dr. N.L. KADAM**

**(M.COM, M.phil, Phd, M.B.A.)**

**Through the**

**THE PRINCIPAL**

**ANEKANT EDUCATION SOCIETY'S**

**JAYSINGPUR COLLAGE JAYSINGPUR**

**2020-2021**



## SHRI BHARAT URBAN CO-OP. BANK LTD;

Head Office : 8th Lane, Jaysingpur 416 101

P.B.No. 18, Tal. Shirol, Dist. Kolhapur

☎ : (02322) 225722, 225430, 225723, 229923, Fax.- (02322) 225723

Ref. No. 455

Date 26/03/2021

### CERTIFICATE

This is certify that Miss. Bhagyashri Arvind Kumthekar a student of Master of Commerce (M. com II) in Shivaji University, Kolhapur , has successfully completed her project on “A comparative study of Advances with reference to the Nandani Sahakari Bank Ltd., Nandani and Shri. Bharat Urban Co-Op. Bank Ltd., Jaysingpur ” in our Shri Bharat Urban Co-Op.Bank Ltd, Jaysingpur. The period from 17-02-2021 to 26-03-2021.

She found hard working and sincere during the tenure of her project. She has completed his project by taking full knowledge regarding analysis of our Bank.

We wish her all the best for her future endeavors.

For Shri Bharat Urban Co-op.Bank Ltd., Jaysingpur

  
In charge Chief Executive

# Science Project Reports



**A Project Report on**

**“Common impression cylinder flexography printing machine  
demo”**

**For the partial fulfillment of requirement of the award**

**BACHELOR OF VOCATIONAL IN PRINTING AND PUBLISHING**

**By**

**Rafiya R. Rangole**

**Pradnya S. Lambe**

**Shubhdha S. Lambe**

**Sahil A. Nadaf**

**Kedar V. Shukla**

**Rushikesh D. Kadam**

**Rohan S. Gaikwad**

**Under the Guidance of**

**Mr.Suhas V. Khondre, Miss.Nisha S. Mane**

**Through**

**THE PRINCIPAL**

# Jaysingpur College, Jaysingpur

2020-21

## Reports of Food Science 2020-21

Department of food science and quality control Celebrated 'International Womens Day' on 8<sup>th</sup> March 2021 by Organizing Food Festival in Jaysingpur College, Jaysingpur. Mayor of Jaysingpur Dr. Nita Mane Mam inograted the function and Principal Dr. R.R. Kumbhar Sir Deliverd introductory speech.

- 26 Food stalls of different innovative, nutritious, healthy food were arranged by the students.
- There were 95 students participated in the food festival.













**A Project Report on**

**“Design and Fabrication of E-Cycle”**

**For the partial fulfillment of requirement of the award**

**BACHELOR OF VOCATIONAL IN AUTOMOBILE**

**By**

**3<sup>rd</sup> year Student**

**2020-21**

**Under the Guidance of**

**Mr. Suraj Girmal**

Head of Department

**Mr.Shreyas Pandit, Mr.Abhijeet Patil**

**Through**

**THE PRINCIPAL**

**Jaysingpur College, Jaysingpur**

**2020-21**



**PROJECT REPORT  
ON**

**"Ecology of Shirol and Tamadolge Freshwater Tanks"**

**SUBMITTED TO**

Department of Zoology  
Jaysingpur College Jaysingpur

For the fulfillment of  
Bachelor's Degree in Science

**BY**

Danole Rutuwika Bapuso  
Anure Aishwarya Mahadev  
Naik Pooja Dattatray

**UNDER THE GUIDANCE OF**

Dr. Sachinkumar R. Patil  
Assistant Professor  
Department of Zoology  
Jaysingpur College Jaysingpur

**2020-21**

**PROJECT REPORT  
ON**

**“Analysis of physico-chemical parameters in drinking water of various  
villages of Shirol Tahsil, Kolhapur District (MS)”**

**SUBMITTED TO**

Department of Zoology  
Jaysingpur College Jaysingpur

For the fulfillment of  
Bachelor’s Degree in Science

**BY**

Pandare Kranti Kakaso  
Powar Pooja Shrikrishna  
Jalpure Rupali Satish

**UNDER THE GUIDANCE OF**

Dr. Sachinkumar R. Patil  
Assistant Professor  
Department of Zoology  
Jaysingpur College Jaysingpur

**2020-21**

# B.SC III Project 2020-21

Page: 6  
Date: / /



JAYSINGPUR COLLEGE,  
JAYSINGPUR.

DEPARTMENT OF CHEMISTRY

A Project Report on,  
“Preparation of Soaps Using Different  
Types of oils”

Submitted to,  
SHIVAJI UNIVERSITY, KOLHAPUR

By,  
Miss. Bhakti Chandrakant Jadhav.  
Miss. Rachana Rajendra Magdum.  
Miss. Nazneen Shouqat Nayani.

Under the Guidance of,  
Mr. Rohant Dhabbe

2020-2021

ANEKANT EDUCATION SOCIETY'S  
JAYSINGPUR COLLEGE,  
JAYSINGPUR.

DEPARTMENT OF CHEMISTRY

**CERTIFICATE**

Following Bsc. III students has been satisfactorily completed that Project entitled as  
"Soil Testing and Analysis Nutrient Management Basics"

In the year 2020-21 & submitted the same.  
This work represents bonafide work of the student

SUBMITTED BY :

LOHAR NAMRATA BALASO

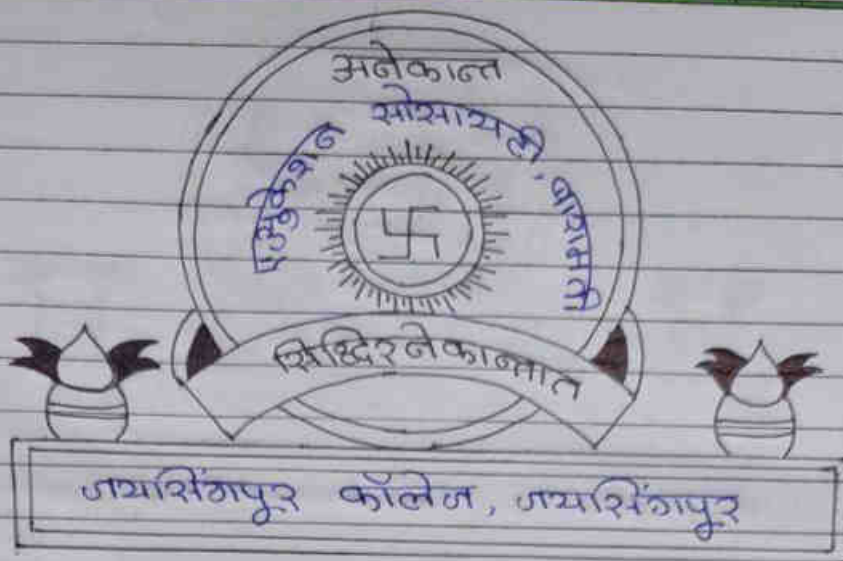
ROLL NO :- 95

To the best of my knowledge this is the original work of the student and has not been submitted elsewhere for any other degree,

*Rishabh*  
Project Guide

Rishabh

Head Dept. of chemistry



# JAYSINGPUR COLLEGE JAYSINGPUR

## DEPARTMENT OF CHEMISTRY

A Project Report on,

### "Preparation of Perfumes"

Submitted To,  
SHIVAJI UNIVERSITY, KOLHAPUR  
BY,

MISS. Priyanka Arun Patil

MISS. Apaksha Anil Patil

Under the guidance of  
Ronant Dhabbe

2020-21





**A Project Report on**

**“Die vertical printing machine demo”**

**For the partial fulfillment of requirement of the award**

**BACHELOR OF VOCATIONAL IN PRINTING AND PUBLISHING**

**By**

**Sanket S. More**

**Indrajit S. Patil**

**Parag R. Ainapure**

**Akshay K.Hukkire**

**Smita A. Raut**

**Abhishek A. Korhale**

**Under the Guidance of**

**Mr.Suhas V. Khondre, Miss.Nisha S. Mane**

**Through**

**THE PRINCIPAL**

**Jaysingpur College, Jaysingpur**

**2020-21**



**A Project Report on**

**“Auto row down machine”**

**For the partial fulfillment of requirement of the award**

**BACHELOR OF VOCATIONAL IN PRINTING AND PUBLISHING**

**By**

**Yogesh A. Pawar**

**Shubham N . More**

**Mohhamadsad S. Momin**

**Navnath H. Dadas**

**Navnath A. Agalave**

**Ranjitsinh J. Kale**

**Under the Guidance of**

**Mr.Suhas V. Khondre, Miss.Nisha S. Mane**

**Through**

**THE PRINCIPAL**

**Jaysingpur College, Jaysingpur**

**2020-21**



A PROJECT REPORT ON  
**“APPLICATION OF COMPLEX ANALYSIS”**

SUBMITTED TO,

**JAYSINGPUR COLLEGE JAYSINGPUR,  
IN PARTIAL FULFILMENT OF THE DEGREE**

**BACHLOR OF SCIENCE IN( MATHEMATICS)**

**BY**

**KOMAL VIJAY KALE**

**Under guidance of ,**

**Dr. Jayvant Patade**



## **CERTIFICATE**

**This is to certify that the project report**

**Entitled**

**“Application of Complex Analysis”**

**Submitted by**

**KOMAL VIJAY KALE**

is a bonafide work carried out by them under the supervision of Dr. Jayvant Patade and it is submitted towards the partial fulfilment of the requirement of Jaysingpur Jaysingpur, in partial fulfillment of Degree for the award of Bachelor of Science in Mathematics.

**Dr. Jayvant Patade**

**(Project Guide)**

**Mr. R.D. Shinde**

**(Head Of Department)**

**Place: Jaysingpur**

**Date: 10/08/2021**

## ***CERTIFICATE BY GUIDE***

*This is to certify that,*

**KOMAL VIJAY KALE**

*I have completed the dissertation work under my guidance and supervision and that, I have verified the work for its originality in documentation, problem statement, implementation and results presented in the dissertation. Any reproduction of other necessary work is with the prior permission and has given due ownership and included in the references.*

***Place:*** Jaysingpur

***Date:*** 10/08/2021

## **DECLARATION**

My self **Komal Vijay Kale** hereby declare that the presented report of project entitled “**Application of Complex Analysis**” Submitted by me to Jaysingpur College Jaysingpur in partial fulfillment of the requirement for the award of the degree of B.SC in Mathematics is a record of project work carried out by me under guidance of Dr.Jayvant Patade I further declare that the work reported in this project has not been submitted and will not be submitted, either in part or in full, for the award of any other degree in this university or any other institute or university.

**Komal Vijay Kale**

**Date: 10/08/2021**

## ACKNOWLEDGMENT

I would like to express my deep and sincere gratitude to my project guide, **Dr. Jayvant Patade** for giving me the opportunity to do project and providing invaluable guidance throughout this work. They have taught me the methodology to carry out the research and to present the research works as clearly as possible. It was a great privilege and honor to work and study under their guidance. I am extremely grateful for what they have offered me. I would also like to thank them for their friendship, empathy, and great sense of humor.

- I am extending my thanks to **Dr. Jayvant Patade** for her support during my project work. I also thank all the staff of Jaysingpur College for their kindness.

Finally, my thanks go to all the people who have supported me to complete the project work directly or indirectly.

# INDEX

<b>No.</b>	<b>Title</b>
<b>1.</b>	<b>What is Complex Analysis ?</b>
	<ul style="list-style-type: none"><li>• Complex Analysis</li><li>• Formal definition of complex numbers</li><li>• Extension of Analytic concepts to complex numbers</li></ul>
<b>2.</b>	<b>Application of Complex Analysis</b>
	<ul style="list-style-type: none"><li>• A complex analysis methodology for forecasting company bankruptcies</li><li>• A complex analysis for signal processing</li><li>• AC circuit analysis</li><li>• Quantum mechanics</li><li>• Industrial applications of complex analysis</li></ul>
<b>3.</b>	<b>Conclusion</b>
<b>4.</b>	<b>Reference</b>

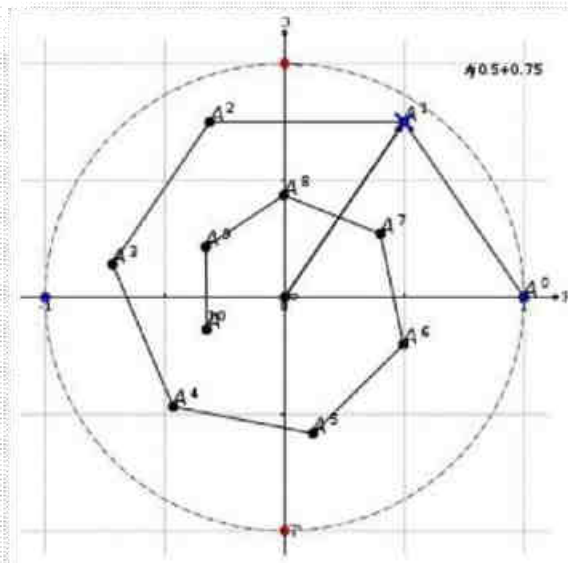


## What is COMPLEX ANALYSIS ?

“COMPLEX ANALYSIS is the study of complex numbers **together with their derivatives, manipulation and other properties.**”

Complex analysis is an extremely powerful tools with an unexpected large number of practical applications to the solution of physical problems. Complex variables, In mathematics, a variable that can take on the value of a complex numbers. In basic algebra, the variables X & Y generally stands for values of real numbers. The algebra of complex numbers uses the complex variables Z to represent a number of the form  $a + bi$ .

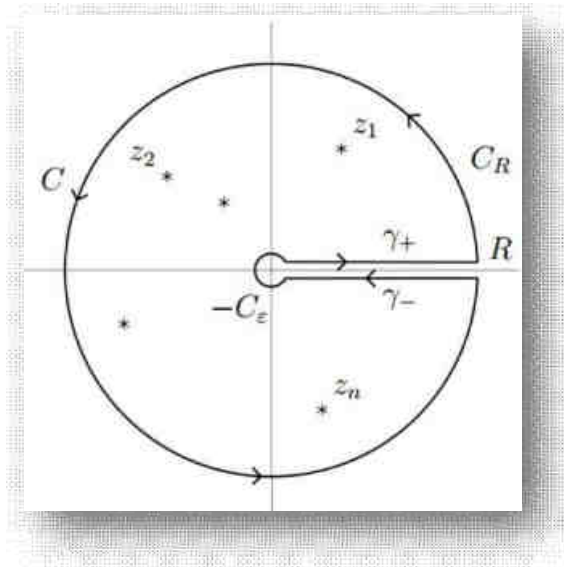
Traditionally known as the theory of functions of complex variables. Contour integration, for example, provides a method of computing difficult integrals by investigating the singularities of the function in regions of the complex plane near and between the limits of integration. In other words, Complex analysis is the branch of mathematics investigating holomorphic functions, i.e. functions which are defined in some region of the complex plane, take complex values, and are differentiable as complex



functions. Complex differentiability has much stronger consequences than usual (real) differentiability.

## • Complex analysis

The 18<sup>th</sup> century a far-reaching generalization of analysis was discovered, centred on the so-called imaginary number  $I = \text{Square root of } \sqrt{-1}$ . (In engineering this number is usually denoted by  $j$ .) The numbers commonly used in everyday life are known as real numbers, but in one sense this name is misleading. Numbers are abstract concepts, not objects in the physical universe. So mathematicians consider real numbers to be an abstraction on exactly the same logical level as imaginary numbers.



The name imaginary arises because squares of real numbers are always positive. In consequence, positive numbers have two distinct square roots—one positive, one negative. Zero has a single square root—namely, zero. And negative numbers have no “real” square roots at all. However, it has proved extremely fruitful and useful to enlarge the number concept to include square roots of negative numbers. The resulting objects are numbers in the sense that arithmetic and algebra can be extended to them in a simple and natural manner; they are imaginary in the sense that their relation to the physical world is less direct than that of the real numbers. Numbers formed by combining real and imaginary components, such as  $2 + 3i$ , are said to be complex (meaning composed of several parts rather than complicated).

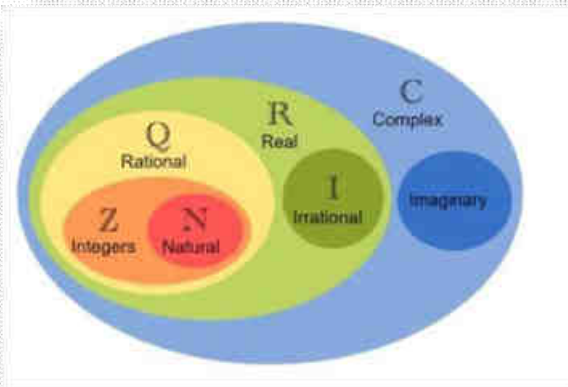
The first indications that complex numbers might prove useful emerged in the 16<sup>th</sup> century from the solution of certain algebraic equations by the Italian mathematicians Girolamo Cardano and Raphael Bombelli. By the 18<sup>th</sup> century, after a lengthy and controversial history, they became fully established as sensible mathematical concepts. They remained on the mathematical fringes until it was discovered that analysis, too, can be extended to the complex domain. The result was such a powerful extension of the

mathematical tool kit that philosophical questions about the meaning of complex numbers became submerged amid the rush to exploit them. Soon the mathematical community had become so used to complex numbers that it became hard to recall that there had been a philosophical problem at all.

## • Formal definition of complex numbers

The modern approach is to define a complex number  $x + iy$  as a pair of real numbers  $(x, y)$  subject to certain algebraic operations. Thus one wishes to add or subtract,  $(a, b) \pm (c, d)$ , and to multiply,  $(a, b) \times (c, d)$ , or divide,  $(a, b)/(c, d)$ , these quantities. These are inspired by the wish to make  $(x, 0)$  behave like the real number  $x$  and, crucially, to arrange that  $(0, 1)^2 = (-1, 0)$ —all the while preserving as many of the rules of algebra as possible. This is a formal way to set up a situation which, in effect, ensures that one may operate with expressions  $x + iy$  using all the standard algebraic rules but recalling when necessary that  $i^2$  may be replaced by  $-1$ . For example,

$$(1 + 3i)^2 = 1^2 + 2 \cdot 1 \cdot 3i + (3i)^2 = 1 + 6i + 9i^2 = 1 + 6i - 9 = -8 + 6i.$$

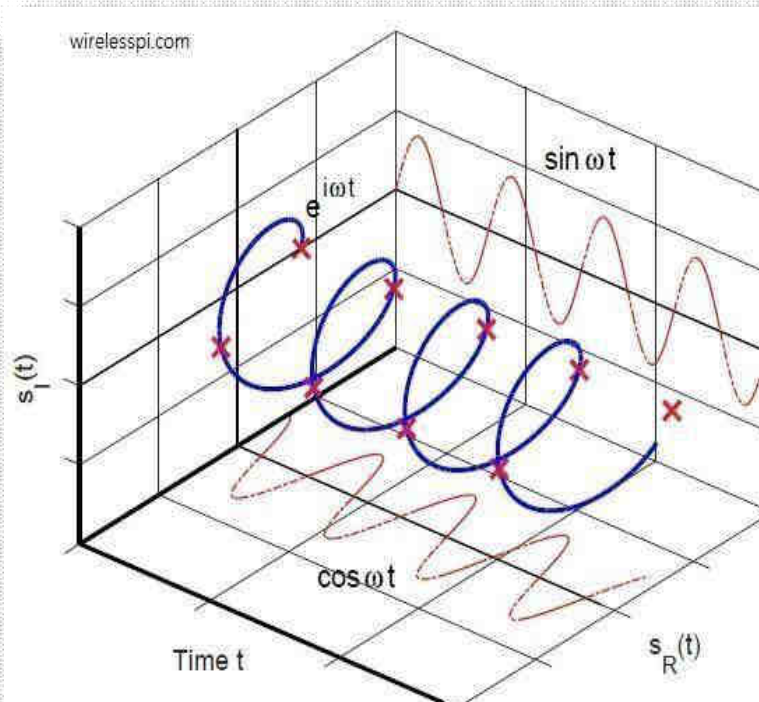


A geometric interpretation of complex numbers is readily available, in as much as a pair  $(x, y)$  represents a point in the plane shown in the figure. Whereas real numbers can be described by a single number line, with negative numbers to the left and positive numbers to the right, the complex numbers require a number plane with two axes, real and imaginary.

A point in the complex plane. Unlike real numbers, which can be located by a single signed (positive or negative) number along a number line, complex numbers require a plane with two axes, one axis for the real number component and one axis for the imaginary component. Although the complex plane looks like the ordinary two-dimensional plane, where each point is determined by an ordered pair of real numbers  $(x, y)$ , the point  $x + iy$  is a single number.

- **Extension of analytic concepts to complex numbers**

A concepts such as limits, derivatives, integrals, and infinite series (all explained in the sections Technical preliminaries and Calculus) are based upon algebraic ideas, together with error estimates that define the limiting process: certain numbers must be arbitrarily well approximated by particular algebraic expressions. In order to represent the concept of an approximation, all that is needed is a well-defined way to measure how “small” a number is. For real numbers this is achieved by using the absolute value  $|x|$ . Geometrically, it is the distance along the real number line between  $x$  and the origin  $0$ . Distances also make sense in the complex plane, and they can be calculated, using Pythagoras’s theorem from elementary geometry (the square of the hypotenuse of a right triangle is equal to the sum of the squares of its two sides), by constructing a right triangle such that its hypotenuse spans the distance



between two points and its sides are drawn parallel to the coordinate axes. This line of thought leads to the idea that for complex numbers the quantity analogous to  $|x|$ .

## Application of complex analysis

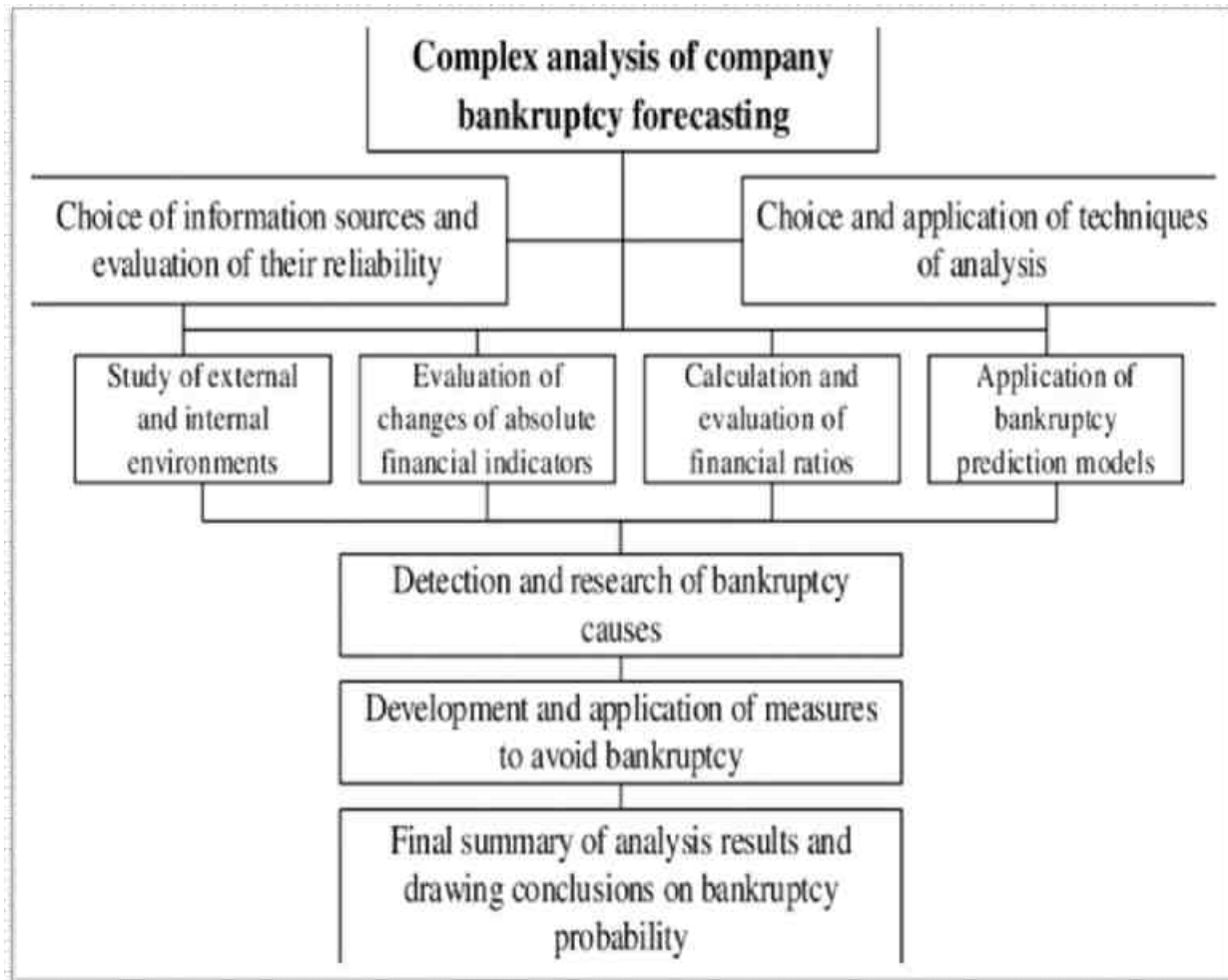
There are huge applications of complex analysis. Complex Analysis use in various fields viz., Physics, Engineering fields and so on. Because complex functions have such incredible properties, they are useful even for problems that at first don't seem to involve complex numbers. Far from wanting to avoid complex functions because they are "complex," applied mathematicians look for ways to introduce complex functions because they simplify analysis.

## ○ A COMPLEX ANALYSIS METHODOLOGY FOR FORECASTING COMPANY BANKRUPTCIES

Company bankruptcy forecasting is a very difficult process because it is necessary to evaluate various business operations and economic events as objectively as possible, to disclose the factors that have the greatest influence on the



financial situation and the results of the company's activity. It is possible to achieve this only by performing a complex analysis of bankruptcy forecasting.

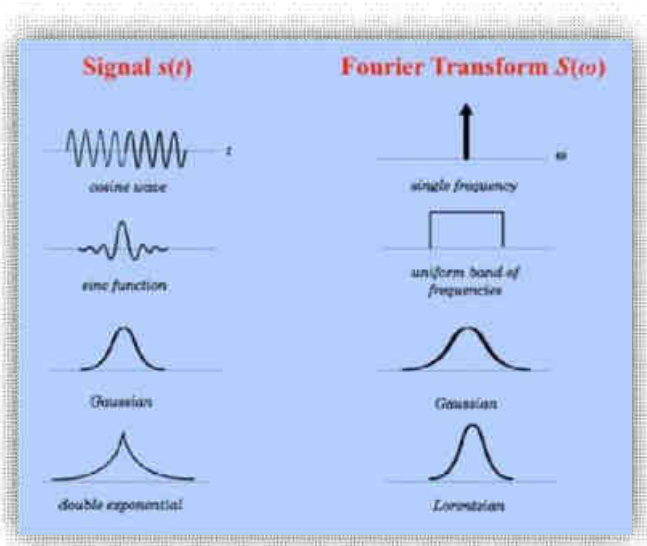


It is appropriate to start the complex analysis of company bankruptcy forecasting by choosing technical methods and information sources. When carrying out a complex analysis of company bankruptcy, the main sources of information are companies' financial statements (a balance sheet, a profit and loss statement, a cash flow statement, a statement of changes in equity, explanatory notes, and an annual report). These statements describe the operating (productive, commercial), investing and financing activities during a certain period of time.

A well prepared complex analysis for forecasting a company's bankruptcy helps to determine the company's possibilities in crisis situations, explain the most complex activity fields, expose the technical and organizational drawbacks of activity as well as their causes, determine the particular measures to eliminate them and ascertain the reserves to improve the activity; all this is based on the recommended methodology. After evaluating some qualities of the companies' activity, this methodology might be successfully applied in all companies regardless of their size, legal form and industry.

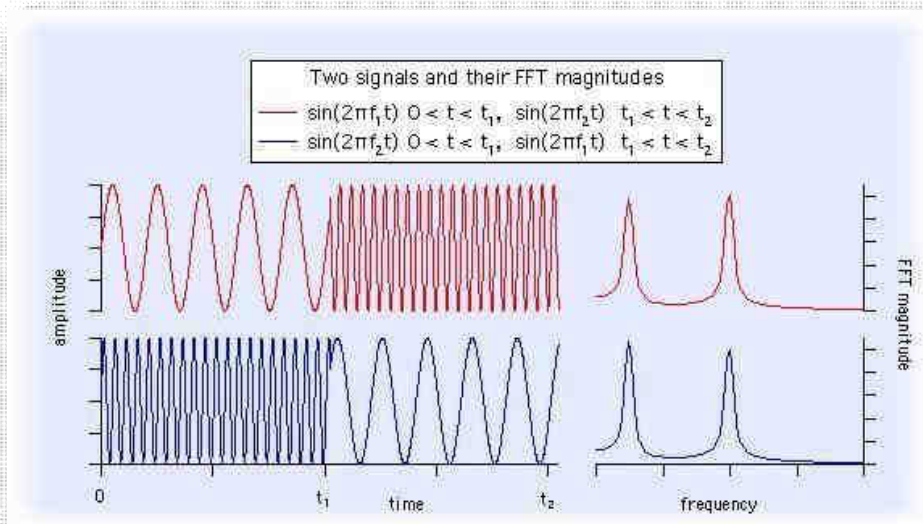
## ○ A COMPLEX ANALYSIS FOR SIGNAL PROCESSING -

In signal processing, the Fourier transform often takes a time series or a function of continuous time, and maps it into a frequency spectrum. ... When the function  $f$  is a function of time and represents a physical signal, the transform has a standard interpretation as the frequency spectrum of the signal.



The Fourier transform is a mathematical formula that relates a signal sampled in time or space to the same signal sampled in frequency. In signal processing, the Fourier transform can reveal important characteristics of a signal, namely, its frequency components. The Fourier Transform changes time

domain to frequency domain and back again.



Suppose a pianist is recording in a music studio. He invites you to a game – to guess what musical notes he plays without looking at the piano. As someone who doesn't have perfect pitch (the ability to tell what musical note it is just by hearing), how would you win this game ?

It turns out, there is a way to always deduce what notes he is playing without cheating. Firstly, record his playing in an audio editing software. The software will store the recording in



a waveform. One can then apply Fourier Transform to the waveform signal to figure out which frequencies are the most prevalent within the recording. This can be shown by deducing the 'peaks' in the resulting frequency distribution after Fourier Transform has been applied. As there are evident peaks at 256 Hz and 391 Hz (which correspond to C4 and G4, respectively), we can therefore deduce that the pianist must have played C and G on the piano. Knowing the locations of peaks is incredibly important to audio-editors and music producers. They can not only derive the source of any



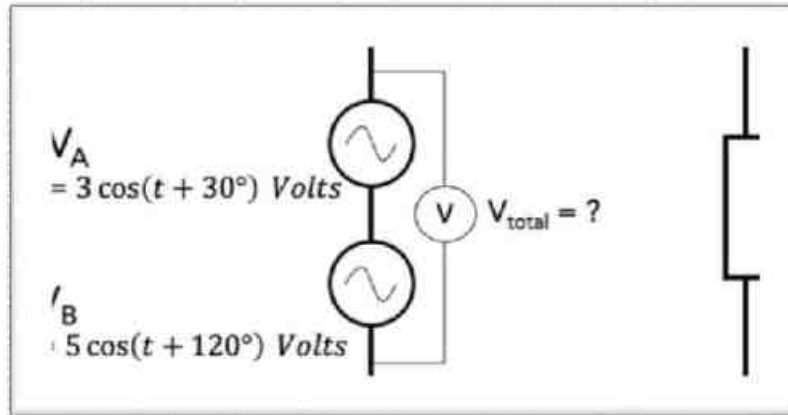
background noise but also use its frequency as a reference to eliminate them through the means of Equalisation (EQ).

The diagram shows the Fourier Transform equation:  $\hat{g}(f) = \int_{-\infty}^{\infty} g(t) e^{-2\pi i f t} dt$ . Annotations include: 'Desired Frequency' pointing to  $f$ ; 'Original wave' pointing to  $g(t)$ ; 'Does the effect of "wrapping" the wave around the origin' pointing to  $e^{-2\pi i f t}$ ; and 'Summing all possible points on the "wrapped" wave' pointing to the integral symbol.

The idea behind the Fourier Transform is rather genius; it proposes that any complicated wave can be decomposed into multiple sinusoidal waves with varying frequencies. What Fourier Transform does is that it predicts which frequency is likely to be equivalent to one of such sinusoidal waves. It does this by 'wrapping' the wave around the origin in the complex plane and computing the sum of complex coordinates of all possible points on the wrapped wave.

## ○ AC CIRCUIT ANALYSIS

Complex numbers are also utilised in calculations of current, voltage or resistance in AC circuits (AC stands for Alternating Current, which is a current that changes magnitude and direction over time). A common application of complex numbers (more specifically, Euler's formula) is to compute the potential difference across two AC power supplies with respect to time. On the right is an example of such a calculation.



To find the combined potential difference, simply adding  $V_A$  and  $V_B$  together will not work. However, we can express both voltages as the Real Part (x-coordinate on the Argand Diagram) of a complex number.

$$\text{Let } Z_A = 3 (\cos(t + 30^\circ) + i \sin(t + 30^\circ));$$

$$\text{hence } V_A = \text{Re}|Z_A|$$

$$\text{And let } Z_B = 5 (\cos(t + 120^\circ) + i \sin(t + 120^\circ))$$

$$\text{so that } V_B = \text{Re}|Z_B|$$

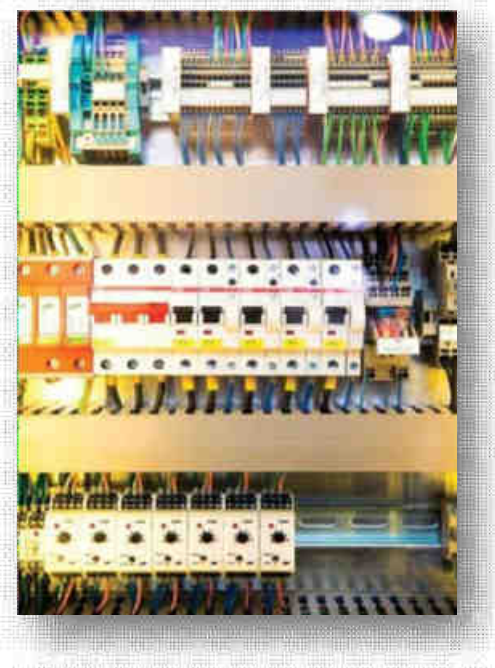
$$\text{Note that } Z_A = 3e^{jt30^\circ} \text{ and } Z_B = 5e^{jt120^\circ}.$$

It is conventional to use  $j$  instead of  $i$  to represent imaginary numbers in circuit analysis, to avoid confusion with current (which its symbol is  $I$  or  $i$ ). We can then add the complex numbers and factorise:

$$\begin{aligned} Z_A + Z_B &= 3e^{j(t+30^\circ)} + 5e^{j(t+120^\circ)} \\ &= e^{jt} (3e^{j(30^\circ)} + 5e^{j(120^\circ)}) \\ &= e^{jt} (3(\cos(30^\circ) + j \sin(30^\circ)) + 5(\cos(120^\circ) + j \sin(120^\circ))) \\ &= e^{jt} (0.098... + 5.830...j) \\ &= e^{jt} \times \sqrt{34} (\cos(89.0 \dots^\circ) + j \sin(89.0 \dots^\circ)) \\ &= e^{jt} \times \sqrt{34} \times e^{j89.0 \dots^\circ} \\ &= \sqrt{34} e^{j(t+89.0 \dots^\circ)} \end{aligned}$$

$$\text{Hence } V_{\text{total}} = \text{Re}|Z_{\text{total}}| = \sqrt{34} \cos(t + 89.0 \dots^\circ) \text{ Volts}$$

Furthermore, complex numbers are also used to express the magnitude and phase of impedance in an AC circuit. Impedance is very similar to resistance – it slows down the electrons in the circuit. The distinction is that impedance causes a phase shift on the electrical current, while resistance does not. Impedance takes place in common electrical components such as inductors and capacitors, and so having a complex number representation is crucial. In general, complex numbers serve as a representation of phase, which is essential to analysing AC circuits.



## ○ QUANTUM MECHANICS

Quantum Mechanics is a field of Physics that deals with the motions and interactions between subatomic particles – mainly Bosons (e.g. a photon) and Fermions (e.g. a neutron). It provides a mathematical description of their behaviour in terms of probabilities. In fact, complex numbers form the fundamental basis of Quantum Mechanics. The importance of the Schrödinger Equation to Quantum Mechanics is analogous to that of Newton's Second Law to Classical Physics; they both provide a sensible mathematical prediction of a particle's position and momentum.

It is conventional to use  $\Psi$ (psi)  
to denote the wave function

$$\frac{-\hbar}{2m} \frac{\partial^2 \Psi(x,t)}{\partial x^2} + V(x,t) \Psi(x,t) = i\hbar \frac{\partial \Psi(x,t)}{\partial t}$$

↑
↑
↑

Kinetic Energy                  Potential Energy                  Total Energy

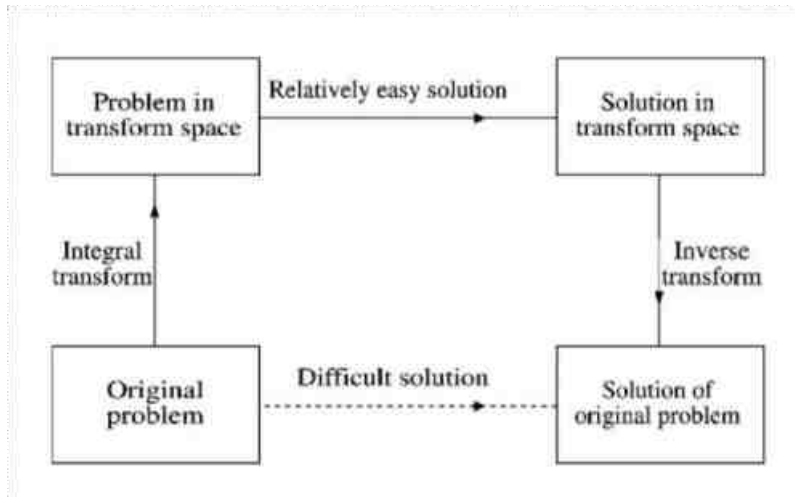
The system of complex numbers is essential to the field because it is a convenient language for expressing wave functions without breaking the rules. Furthermore, a direct application of Quantum Mechanics is that it accelerated the expansion of Chemistry. In 1927, Walter Heitler (not Hitler!) and Fritz London formulated the Valence Bond Theory. One main area of concern in Quantum Mechanics is to find the wave function of a subatomic particle. A wave function, simply put, is a complex probability distribution indicating the possible positions of the particle on a specific time. A fundamental formula in Quantum Mechanics, in which the role of the wave function is significant,

## ○ INDUSTRIAL APPLICATIONS OF COMPLEX ANALYSIS

Importantly, there has been a surge of activity in the advancement of complex analysis method in recent years, driven by application in engineering, biology and medicine.

The application of these methods to real world problems include propagation of acoustic waves relevant for the design of Jet engine, development of boundary-integral techniques useful for solution of many problems arising in solid and fluid mechanics as well as conformal geometry in imaging shape analysis and computer vision.

In applications to physics and engineering, complex analysis provides different tools than one could expect



In engineering, such as electrical and mechanical, it is a wellknown method of finding the time function by means of its integral transform, illustrated on the previous page. Finding the inverse transform is studied, as according to Appendix A, in terms of the inverse Laplace transformation:

$$F(t) = \frac{1}{2\pi i} \int_{\gamma-i\infty}^{\gamma+i\infty} e^{st} f(s) ds.$$

In this inverse transform, one has rotated the line of integration through 90°

(by using  $Ds = i du$ ).

The path has become an infinite vertical line in the complex plane, the constant  $\Gamma$  having been chosen so that all the singularities of  $f(s)$  are on the left-hand side. Similar rotation, the Wick rotation, further expounded upon in Appendix C, was first used by Gian Carlo Wick [5], and is an analytic continuation of  $t > 0$  into  $-it$ , sometimes into  $it$ , both leading to  $t^2 \rightarrow -t^2$

## CONCLUSION

- A well prepared complex analysis for forecasting a company's bankruptcy helps to determine the company's possibilities in crisis situations, explain the most complex activity fields, expose the technical and organizational drawbacks of activity as well as their causes, determine the particular measures to eliminate them and ascertain the reserves to improve the activity.
- In signal processing, the Fourier transform can reveal important characteristics of a signal, namely, its frequency components
- complex numbers serve as a representation of phase, which is essential to analysing AC circuits.
- In applications to physics and engineering, complex analysis provides different tools than one could expect

## REFERENCE

- <http://complex-analysis.com>
- <http://www.coursera.org>
- Scheidemann, v., Introduction to Complex Analysis
- Ablowitz and Fokas, Complex Variables: Introduction and Application

*HANK YOU*





A PROJECT REPORT ON

*Applications of Mathematics  
in Science*

SUBMITTED TO,

JAYSINGPUR COLLEGE JAYSINGPUR,

IN PARTIAL FULFILMENT OF THE DEGREE

BACHELOR OF SCIENCE IN( MATHEMATICS)

By

*Miss. Varsharani Prakash Khot*

Under guidance of .

*Prof. Dr. Jayvant Patade*





## CERTIFICATE

This is to certify that the project report

Entitled  
Applications of Mathematics  
in Science

Submitted by

Miss. Varsharani Prakash Khot

is a bonafide work carried out by them under the  
supervision of

Prof. Dr. J. Patade and it is submitted towards the partial  
fulfilment of the requirement of Jaysingpur Jaysingpur, in  
partial fulfillment of Degree for the award of Bachelor of  
Science in Mathematics.

Prof. Dr. J. Patade  
(Project Guide)  
Department)

Prof. Mr. R. D. Shinde  
(Head Of

**CERTIFICATE BY  
GUIDE**

*This is to certify that,*

*Miss. Varsharani PrakasKhot*

*Have completed the dissertation work under my guidance and supervision and that, I have verified the work for its originality in documentation, problem statement, implementation and results presented in the dissertation. Any reproduction of other necessary work is with the prior permission and has given due ownership and included in the references*

Place: Jaysingpur

Date:

## DECLARATION

*My self Miss. Varsharani Prakash Khot hereby declare that the presented report of project entitled “Applications of Mathematics in Science” Submitted by me to Jaysingpur College Jaysingpur in partial fulfilment of the requirement for the award of the degree of B.Sc in Mathematics is a record of project work carried out by me under guidance of Prof. Dr.J.Patade. I further declare that the work reported in this project has not been submitted and will not be submitted, either in part or in full, for the award of any other degree in this university or any other institute or university.*

## ACKNOWLEDGMENT

*I would like to express my deep and sincere gratitude to my project guide, Prof. Dr.J.Patade for giving me the opportunity to do project and providing invaluable guidance throughout this work. They have taught me the methodology to carry out the research and to present the research works as clearly as possible. It was a great privilege and honor to work and study under their guidance. I am extremely grateful for what they have offered me. I would also like to thank them for their friendship, empathy, and great sense of humor.*

*I am extending my thanks to Prof. Dr.J.Patade for his support during my project work. I also thank all the staff of Jaysingpur College for their kindness.*

# Index

Sr. No.	Name	Pg. No.
1	Introduction	07
2	What is Mathematics?	08
3	Mathematics in Various Fields	09
4	Types of Mathematical Concepts	10
5	Applications of Mathematics in Science	11
6	Some Interesting Facts	14
7	Why is Mathematics Important to Science	15
8	Mathematics in Environmental Science	19
9	References	28

## ❖ Introduction

In 18th century mathematics was already become a part of modern science. Mathematics begins to develop very fast because of it's introduction to schools. Therefore everyone have a chance to learn the basic fundamentals of mathematics in 21st century mathematics is used in robotics In space research In sports In Biological calculation In field of information technology etc. Even those suffering from math related anxieties or phobias cannot escape its everyday presence in their lives. From home to school to work and places in between, math is everywhere.

Mathematics is a powerful problem solving tool and a highly creative field of study that explains diverse phenomena such as the human nervous system, the evolution of life forms and the stockmarket.

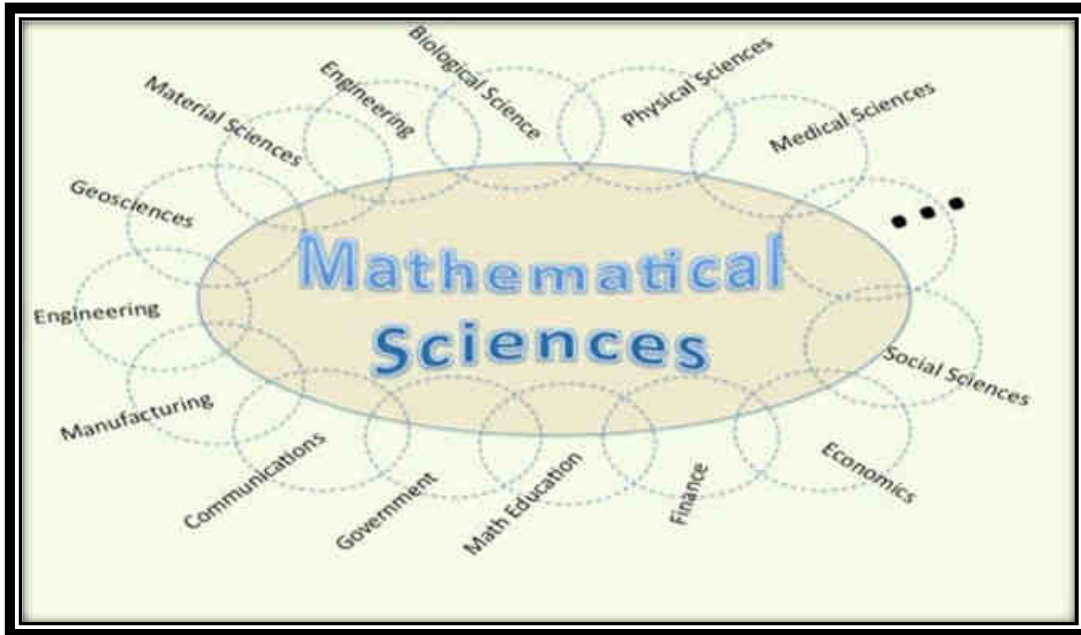
Mathematics is the science that deals with the logic of shape, quantity and arrangement. Math is the Universal language of achieving great heights. Math is all around us, wherever we go or whatever we do we use math and sometimes we use it without even realizing.

Math can and has opened new worlds for humankind.

## ❖ **What is Mathematics?**

Mathematics is described by people as the only science that will ever prove anything, the only science capable of providing an absolute "yes" or "no" answer, and as the purest science. The word comes from the Greek translation of mathema which means 'teaming' or 'study'. Without mathematics, there would be no applied or theoretical science. There would be no atmospheric sciences, not would there be architecture, physics, chemistry, biology or anything else. That because it is the examination and application of numbers including quantities, volumes, structures, and patterns and order. It uses concepts such as abstraction and logic, numbering and calculation. measurement of volume and distance, and the quantification of shape and motion (various which includes speed)

## ❖ Mathematics In Various Fields



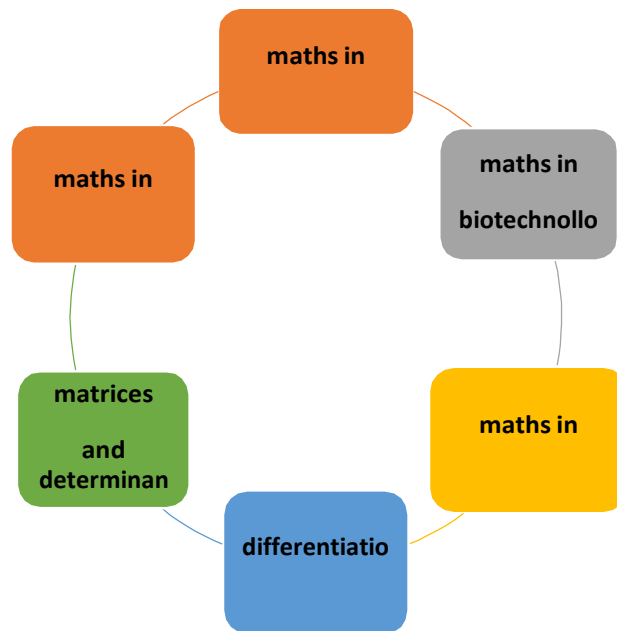


## ❖ **Types of Mathematical Concepts**

Mathematics expresses itself everywhere, in almost every facet of life in nature all around us, and in the technologies in our hands. Mathematics is the language of science and engineering - describing our understanding of all that we observe.

- Addition
- Subtraction
- Multiplication
- Division
- Function
- Graph Theory
- Probability
- Geometry
- Algebra
- Algebraic Number Theory
- Analytic Number Theory
- Analytic Geometry
- Mathematical Analysis
- Differential Equation

## ❖ Applications of Mathematics in Science



### ➤ Maths in Medicine

Medical professionals use math when drawing up statistical graphs of epidemics or success rates of treatments. Math applies tox-rays and CAT scans.

### ➤ Maths in biotechnology

- Like calculus, linear algebra, graph geometry equation and coding theory is used.
- For finding the estimation of DNA, there is use of maths  
Calculate the composition of any culture

- There is lots of subjects, come in biotechnology like bioinformatics, fluid machinces, heat transfer, physics, chemistry, biostatistics etc...
- If u placed in any industrial company there is use of maths for calculating the estimation, percentage, pH
- Big role in bioinformatics, matching deleting sequence of DNA during the process, biostatistics are used in respect to maths like finding the previous data of any research or stored data, we can find mean, median, statistics

## ➤ **Maths in Mechanics**

- Mechanical Engineers use Maths with analytical and problem solving abilities to develop or repair new machines.
- The general study of the relationship between motion, forces and energy is called Mechanics.

### Examples of application of maths in mechanics-

- Speed is measured as distance travelled / time taken
- Force exerted = Mass x Acceleration
- Gravity of Earth is 9.8 metres / second

## ➤ **Differentiation**

### **1. Energy Systems Engineering (Mechanical & Civil):**

Computational fluid dynamics, modelling of airflow in buildings, design of HVAC systems, wave equation for water and seismic waves

### **2: Electrical and Electronic Engineering:**

Calculation of currents in a circuit, wave propagation, design of semiconductors, Image Analyses (e.g. edge detection)

### **3. Civil Engineering:**

Hydraulics, conservation of mass equations (e.g. wastewater and water treatment), air pollution models, design of reactor vessels, predicting quantities of materials necessary for construction, design of foundations (soil consolidation), computational solid mechanics

## ➤ **Matrices and determinants**

### **1. Civil Engineering:**

Traffic engineering and modelling, structural engineering (trusses). structural engineering

### **2. Electrical Engineering (A.C. Circuits):**

Electrical networks

### **3. *Electronic Engineering & IT:***

Computer graphics (zoom, rotations, transformations, animation etc), Google search algorithms, Image analysis including facial recognition, simplification of complex data sets, advanced data and systems modelling, digital communications

### **4. *Mechanical Engineering:***

Mechanics, representation of stress and strain

### **5. Energy Systems Engineering:**

## **➤ Maths in Astronomy**

- Astronomers use maths all the time.
- It is used to perform calculations when we look at the objects in the sky with a telescope.



### **Some interesting facts**

- Our galaxy milkyway is about  $100 \times 10^3$  light years wide
- Moon is about 150 million km from the sun
- The diameter of our planet Earth is 12742 km

## • Why is Mathematics Important to Science?

Mathematics is as much of a tool as it is a science in itself. It creates simple concepts around which other sciences are built and provides a quantitative framework for building hypotheses and theories not always dealing in absolutes, but always reaffirming evidence. Many of our sciences would not exist were it not for the mathematical framework and especially without the areas of mathematics listed in a later section of this guide. Math is arguably the first science and grew up simultaneously in every civilized society since the dawn of time. Even those who practised it did not necessarily see it as a science as we would see it but as a method of solving problems, facts about the world around them, using logic and trial error.

Today, while some modern scientists don't particularly need more than a basic grasp of mathematics - high school level or slightly beyond many could not conduct their work without it. Most do need to understand data science and any researcher in any field needs the thought processes of mathematics. That include statistics, but it also includes arithmetic that we all need - proportions, percentages, and calculating how much change to get from a \$10 bill for an item that costs \$6.49.

As far as the three major sciences go, math is fundamental:

1. Chemistry : Employ mathematics for algorithms such as calculate the structure of molecules and classifying them based on the number of protons, electrons, neutrons etc (4). The number of these particles can change the makeup and actions of a molecule; math is used to count and classify.

For Example :

**calculating the percentage composition of a compound**

**percentage composition**

Example: Percentage composition of copper in copper sulphate  
= Relative atomic mass copper / Relative molecular mass  $\text{CuSO}_4$   
=  $64 / (64 + 32 + 16 \times 4) \times 100$   
= 40 %

Example: What is the mass of copper in 250 grams of  $\text{CuSO}_4$   
Mass of Copper = Percentage composition  $\times$  mass of compound  
= 40%  $\times$  250 grams  
= 100 grams

2. Physics: Calculating the size of the Earth, the distance to the Moon, and plotting both the best routes and the best time to launch missions (5) You may have heard about launch windows for any space-bound mission. This is because the planets,

satellites and other bodies are always moving. There are times when they come close together and the launch must be timed to minimize distance and margin of error. If the time slot passes by, it will take either a long time to reach or they may miss the phenomena completely.

## **For Example :**

### Physics Equation

<p><b>Force</b></p> $\sum \mathbf{F} = \frac{d\mathbf{p}}{dt} = \frac{d(m\mathbf{v})}{dt}$ $\sum \mathbf{F} = m\mathbf{a} \text{ (Constant Mass)}$	<p><b>Velocity</b></p> $v_{\text{average}} = \frac{\Delta d}{\Delta t}$ $v = \frac{ds}{dt}$	<p><b>Motion</b></p> $v = v_0 + at$ $s = \frac{1}{2}(v_0 + v)t$ $s = v_0t + \frac{1}{2}at^2$ $v^2 = v_0^2 + 2as$
<p><b>Acceleration</b></p> $a_{\text{average}} = \frac{\Delta v}{\Delta t}$ $a = \frac{dv}{dt} = \frac{d^2s}{dt^2}$	<p><b>Kinetic Energy</b></p> $T = \frac{1}{2}mv^2$	<p><b>Torque</b></p> $\sum \tau = \frac{dL}{dt}$ $\sum \tau = \mathbf{r} \times \mathbf{F}$
<p><b>Variance</b></p> $s^2 = \frac{1}{N} \sum_{i=1}^N (x_i - \bar{x})^2$	<p><b>Gravity</b></p> $F = \frac{Gm_1m_2}{r^2}$	<p><b>Drude Law</b></p> $\sigma = \frac{k}{\lambda^2 - \lambda_0^2}$
<p><b>Impulse</b></p> $\mathbf{J} = \Delta\mathbf{p} = \int \mathbf{F}dt$ $\mathbf{J} = \mathbf{F}\Delta t \text{ if F is constant}$	<p><b>Mass Energy</b></p> $E = mc^2$	<p><b>Charge</b></p> $Q = It$
	<p><b>Density</b></p> $\rho = \frac{m}{v}$	

3. **Biology:** One area of biology that uses mathematics is population biology (6) This is the examination of species numbers, prevalence and distribution. Biology can deal with predictability in many ways -as we will see below this applies



particularly strongly with the environmental sciences too and especially where they overlap with biology.

For

Example

:

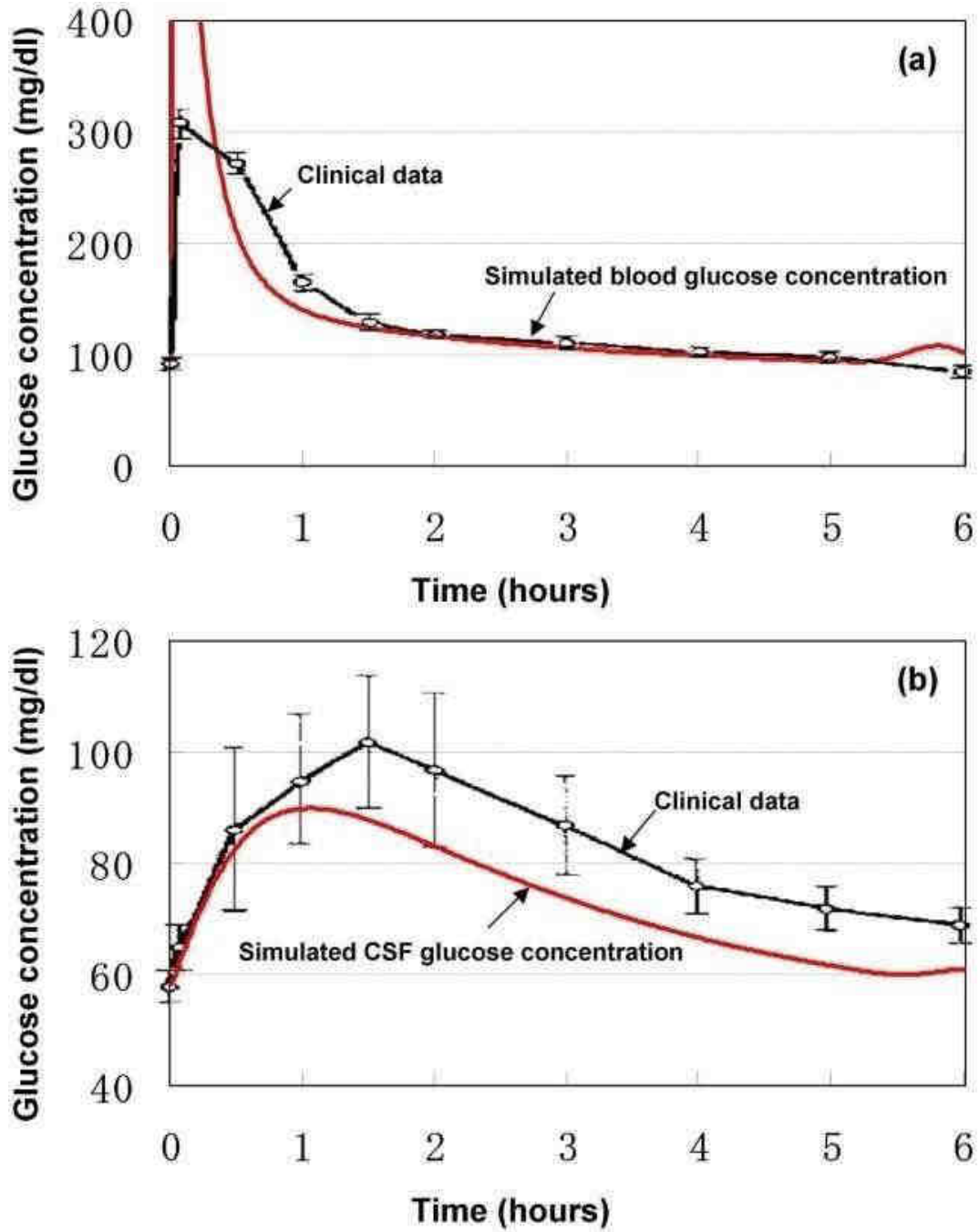


Fig. A Mathematical Model of Brain.

## • Mathematics and Environmental Science

The environmental sciences concern everything about the world around us from the land on which we live to the subsurface rock, our waterways and soils, our built environment, and nature and conservation of plant and animal species. Many of the broad sciences that are classified as environmental sciences utilize math in one way or another.

### **1. Architecture:**

It may be argued that architecture is a form of applied mathematics. It has done so since the dawn of civilization. Working out ratios and proportions of buildings have allowed architects throughout time to build some impressive structures, not least of all the Giza Pyramids whose angle and better-heavy approach has stood the test of time. Architecture is all about angles.

### **2. Atmospheric Sciences:**

Climatology and the other atmospheric sciences such as meteorology is all about reading data and making predictions with simulated models. Both of these concepts require mathematics and climatology would not be able to make

predictions without modelling. At best, they would be educated guesswork and highly inaccurate most of the time. That is as true for today's environment as it is for the paleoclimate. Atmospheric concentrations of greenhouse gases and their effects, local weather patterns, and precipitation levels all require mathematical data.

### 3. ***Ecology:***

Ecology is the science of balance and relationships between living things. That can be anything from the human digestive system and the flora and microbes that live within it, entire ecosystems and the predator-prey relationship and the interdependence between plant life and animals of that landscape. More recently, ecology has developed a subdiscipline called mathematical ecology that uses more quantitative data in its analyses.

### 4. ***Geography:***

Essentially, geography is a science concerned with space and area, distributions, and relationships. That means it uses mathematics in many ways to measure the size or volume of land and bodies of water, the expansion and contraction of

planetary features over time (such as glacial retreat or water levels during excess or low precipitation i.e. flooding or drought). It's most prevalent in the subarea of geophysics which deals with measurements..

## **5. *Zoology:***

The obvious area for zoology as an environmental science is in species monitoring and conservation. We know roughly the balance of predator to prey to maintain equilibrium. We also use mathematics to monitor populations and distribution. This data is used to classify conservation status of species: not evaluated, data deficient, least concern, near threatened, vulnerable, endangered, critically endangered, extinct in the wild, extinct. Each of these grades is based on numbers, distribution, and availability of habitat.

## **6. *Environmental Engineering:***

Engineering and math go hand in hand thanks to the necessities of physics in building projects. Engineers need a solid foundation of advanced mathematics, just as architects do regardless of the field of engineering in which they work. Which aspects of math they need to understand the most varies

though. Mathematics and any innovation in technology require physics and engineering.

## **7. Zoology:**

The obvious area for zoology as an environmental science is in species monitoring and conservation. We know roughly the balance of predator to prey to maintain equilibrium. We also use mathematics to monitor populations and distribution. This data is used to classify conservation status of species: not evaluated, data deficient, least concern, near threatened, vulnerable, endangered, critically endangered, extinct in the wild, extinct. Each of these grades is based on numbers, distribution, and availability of habitat.

## **8. Arithmetic:**

To many people, arithmetic is the ability to do sums in one's head without needing paper and pen, calculator or any other device to work it out. But it's actually much simpler than that. Arithmetic concerns numbers, their values and relationships, and operations addition, subtraction, multiplication and division. It is one of the basics of number theory, dealing with decimals, and forms the basis of any economy, budgeting, bookkeeping (even household

finance). Arguably, it is the one area of math that we all need every minute, every day of our lives to work out times, measurements, distances and so on..

## **9. *Calculus:***

It is another area of math that many people believe is more complicated than it actually is. It's the study of change including distance and time. It differs from arithmetic specified above in that it examines the changes rather than looking for an answer based on the integers, by breaking things down into infinitesimals. There are two branches of calculus: differential calculus which is the study of instantaneous rates such as curves and slopes, and integral calculus, which studies quantities and accumulations and the areas around and underneath curves. Although proto-calculus may have existed before, it is believed that both Isaac Newton and Gottfried Wilhelm Leibniz invented it. It has many uses including and especially in science, design, engineering, and in economics.

## **10. *Combinatorics:***

Lesser known to many outside of mathematics and science, combinatorics is the science of things with finite combinations or structures. For example, it looks to solving simple questions with

difficult answers such as the number of possible combinations for giving cash change from all available coins when presented with a \$1 bill or working out the total possible number of Sudoku puzzles that we can devise. There is no set standard definition, but it is largely described as the being concerned with the enumeration theory, and with combinations and permutations, existing in a finite set of possible answers to a puzzle.

## **11. *Computational Mathematics:***

For reasons that are understandable, this is a relatively new part of mathematics although it did exist before the age of information technology. How we use the term varies depending on whichever aspect of the relationship between computing and mathematics is under discussion. It could refer to applied mathematics and the use of math principles in driving computing or it may refer to the use of computing power to solve or drive complex mathematical equations. Applied computational mathematics can be used in any area of science and has particular uses in data modeling and analysis in such things as atmospheric carbon measurement over time or geographical area.

## **12. *Foundational Mathematics:***

Many areas of science had a foundational aspect, that is, the study of the core principles. Mathematics is no different. The field is dedicated to examining the algorithmic, logical, and the philosophical basis of math. It is simply going back to the core of a subject and in this instance, means the study of the mathematics most basic concept: numbering, sets, functions, geometrical figures, and the framework of the language of math. It has undergone several fundamental shifts with each new problem and addition of theories to solve them, most notably in Euclid's era, Newton's, and then Einstein's.

### **13. *Geometry:***

The study of the shapes of objects - lines, points, circles, angles, circumference and volumes in both two and three-dimensional. This means it is integral to a number of areas including (and especially) cartography, route planning and navigation, civil engineering particularly in the built environment, computer-aided design, MRI and other medical imaging and many other areas.

### **14. *Topology:***

This is the subarea of geometry within mathematics concerned with the properties of space when subject to pressure and



deformations such as crumpling, bending, stretching, compression, and tearing. It is particularly useful for landscape analysis in geology.

## **15. *Mechanics:***

Mechanics examines, through mathematics, behavior of physical bodies under certain pressures, forces, and displacements. It also examines the permanent effects of the changes to those bodies and the environment changes. It began with Aristotle and Archimedes and developed greatly in the Renaissance and pre- enlightenment era. Kepler, Newton and Galileo are largely credited with its application in physics and why the two disciplines are so intertwined today, but that is not the limits of its influence. More recently, it has moved to incorporate motion and force on objects.

## **16. *Operation Research:***

Related to analysis, this is the application of advanced methods in decision making using a wide range of techniques (46). It is a method of applied math, using many principles and ideas to solve real-world problems. It sometimes goes by the name of "management science" or "decision science" and uses computational science, modelling, statistical analysis, especially using powerful technologies. It has uses in complex engineering, environmental

## **17. *Probability:***

Devised by Blaise Pascal, probability is the mathematics of likelihood of an outcome (47). Although largely perceived as an issue with gambling, it also has applications in risk management for investment and business, insurance premium calculation and a variety of other financial services such as the stock market. But probability also has some higher uses. Often expressed as a percentage (with 0% being impossible and 100% being certain), this is not always the case. In mathematical probability, many calculations are expressed in a range of 0-1 instead.

## **18. *Statistics:***


Statistics is about the collection and processing, and the interpretation and presentation of hard data. It is fundamental to any scientific research such as measuring demographics, population change, health issues and resource allocation, percentage changes. Today it includes the methods of data collection as well as the process of collection in order to get a proper and fully accurate sample size. For example, standing outside a church on a Sunday and asking people who come out about their church attendance and whether they are a Christian might lead us to a conclusion that 100% of the population goes to church and 100% go to church every Sunday. Therefore, statistics is as much a philosophy about the collection of data as a tool of collection.

- **References**

1. Wikipedia
2. You Tube

# Jaysingpur College, Jaysingpur 2020-21

Name- Swati Vidyadhar Bhagate

Sub- Environmental Studies 

Roll No. - 46

PRN No. -2019035885

STD - B.COM II

3) परिसंस्था म्हणजे काय ? परिसंस्थेची कार्ये स्पष्ट करा ?

→

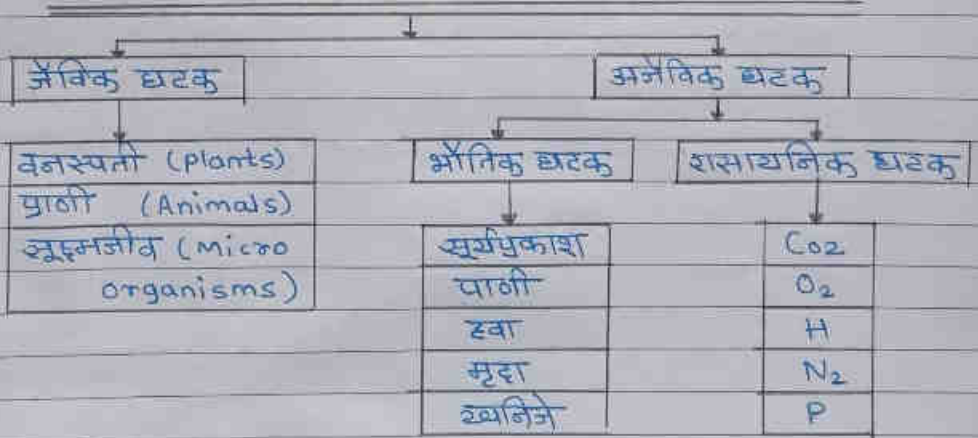
पर्यावरणाचा एक अविभाज्य घटक पृथ्वीवरील जीवसृष्टी आहे. जीवसृष्टीवर पर्यावरणातील घटकांच्या परिणाम होत असतो. त्याचप्रमाणे जीवसृष्टीबाहेरील पर्यावरणीय व्यवस्थेवर प्रभाव पडतो.

पर्यावरणात सजीव व निर्जिव घटक असतात. सजीव व निर्जिव घटकांच्या परस्परसंबंधाच्या अभ्यासास 'परिस्थितिकी' असे म्हणतात.

परिस्थितिकी ही संज्ञा प्रथम ब्रिटिश शास्त्रज्ञ ए.जी. टान्सले यांनी मांडली. इ.स. 1859 ला हर्नस्ट हॅकेल यांनी ecology हा शब्द प्रथम वापरला.

Ecology मध्ये सजीवांच्या अधिवास व पर्यावरण / सजीव जग व प्राकृतिक जग यांच्या शास्त्रीय दृष्टिने अभ्यास करणाऱ्या प्रयत्ना केला गेला. मानवाला व निसर्गाला एकमेकांपासून वेगळे करता येत नाही. मानवाचे संपूर्ण जीवन निसर्ग व्यवस्थेवर अवलंबून आहे.

Components of ecosystem - परिसंस्थेतील घटक -

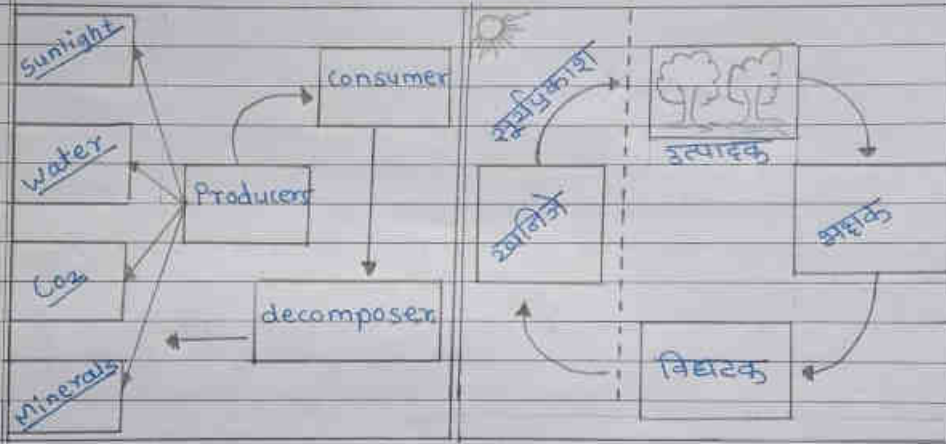


व्याख्या -

(i) "सजीव व त्यांचे वस्तीस्थान यांची एकत्रित संरचना म्हणजे परिसंस्था होय."

(ii) "पर्यावरणातील सजीव व त्यांच्या शानिध्यातील अजैविक पर्यावरण हे एकमेकांशी निगडित असून त्यांच्या परस्पर संबंधास परिसंस्था म्हणतात."

structure of an ecosystem - परिसंस्थेची संरचना -



परिसंस्थेतील वनस्पती व प्राणी यांच्यातील वैशिष्ट्यपूर्ण संबंधास 'परिसंस्था संरचना' असे म्हणतात.

\* उत्पादक - सूर्यप्रकाशाच्या सहाय्याने वनस्पती प्रकाशसंश्लेषण क्रियेत असंक्रिय पदार्थापासून सैद्धीय पदार्थ तयार करतात. स्वतःचे अन्न स्वतः निर्माण करण्याची क्षमता वनस्पतींकडेच आहे म्हणून त्यांना 'स्वयंपोषी' किंवा 'उत्पादक' असे म्हणतात.

\* अन्नक - वनस्पतींचे सेवन 'अन्न' म्हणून प्रत्यक्ष किंवा अप्रत्यक्ष-रित्या प्राणी अन्नक करतात. म्हणून त्यांना 'अन्नक' असे म्हणतात. यावरून प्राथमिक, द्वितीय व तृतीय अन्नक असे तीन प्रकार पडतात.

\* विघटक - मृत वनस्पती व प्राणी यांचे विघटन करणाऱ्या सूक्ष्म जीवांना विघटक असे म्हणतात. उदा. कवके, बुरशी, जीवाणू.

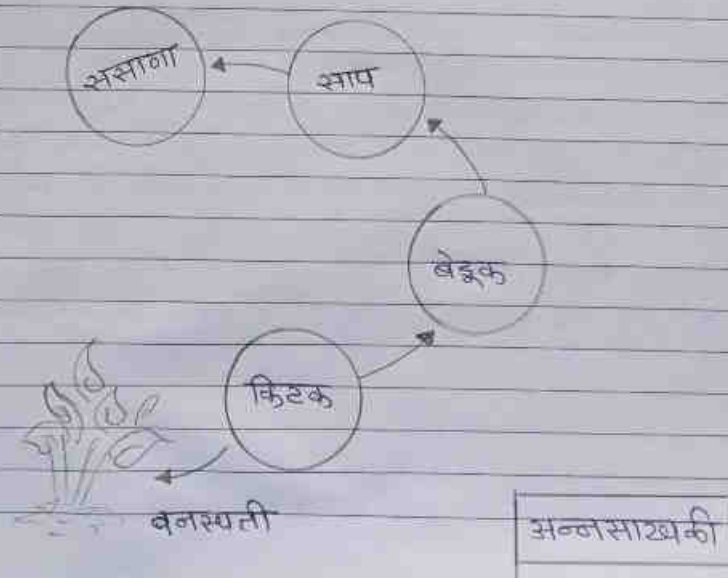
Function of an ecosystem - परिसंश्लेषी कार्ये -

- I) Food chain अन्न साखळी
- II) Food web अन्न जाळी
- III) Trophic structure ऊर्जा विनिमय स्तर.

I) अन्न साखळी -

एका परिसंश्लेषीत एकापेक्षा अधिक व विविध प्रकारच्या अन्नसाखळ्या असू शकतात.

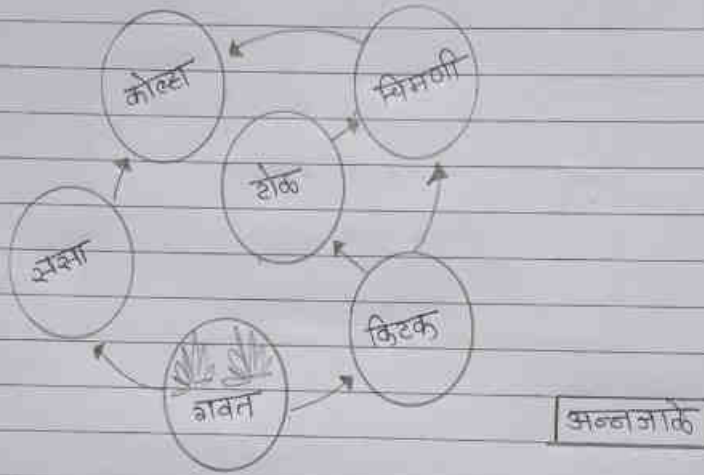
एका विनिमय स्तरापासून दुसऱ्या विनिमय स्तराकडे अन्न ऊर्जेचे संक्रमण होत जाते. यास अन्नसाखळी म्हणतात. वनस्पतींवर शाकाहारी प्राणी जबातात. शाकाहारी प्राण्यांना मांसाहारी प्राणी खातात. वनस्पती, शाकाहारी प्राणी व मांसाहारी प्राणी हे अन्नासाठी परस्परांवर अवलंबून असतात. त्यासाठी ते एकमेकांशी जोडले गेलेले असतात.



## II) अन्नजाळे -

अन्नसाध्यव्याख्या परस्परसंबंधांते अनुबंधित अस आलेल्या जाळीस 'अन्नजाळे' म्हणतात.

विविध प्रकारचे सजीव विविध ऊर्जा विनिमय स्तराशी जोडलेले असतात. की ज्यामुळे प्रत्येक ऊर्जा विनिमय स्तरावर उत्पादक आणि अन्नजाळे अनेक पर्याय उपलब्ध असतात. याला अन्नजाळे म्हणतात.



## III) ऊर्जा विनिमय स्तर -

अन्नसाध्यकीत अन्न ऊर्जा निम्न-स्तरीय जीवांकडून उच्चस्तरीय जीवांकडे संक्रमित होते. प्रत्येक संक्रमणाच्या वेळी प्रत्येक पातळीवर अन्नऊर्जा वापरली जाते, जसजसे उच्चस्तरीय पातळीकडे जावे तसतशी अन्नऊर्जा कमी कमी होत जाते.

एका पाटीमागून एक येणाऱ्या ऊर्जा विनिमय स्तरातील ऊर्जा विनिमय संरचना आणि कार्ये म्हणजेच उत्पादक - शाकाहारी - मांसाहारी, ही परिस्थितिकीय आकृतीच्या अहाथ्याने दाखविते येते.



पहिला ऊर्जा विनिमय स्तर  
(हरित वनस्पती)

↓ ↓ ↓ ↓  
दूसरा ऊर्जा विनिमय स्तर  
(तृणभक्षक)

↓ ↓ ↓ ↓  
तिसरा ऊर्जा विनिमय स्तर  
(मांसभक्षक)

↓ ↓ ↓ ↓  
चतुर्थ ऊर्जा विनिमय स्तर  
(उच्च मांसभक्षक)

↓ ↓ ↓ ↓  
पाचवा ऊर्जा विनिमय स्तर  
(विघटकांचा स्तर)

2) ऊर्जेच्या स्रोतांचे प्रकार कोणते? पर्थायी ऊर्जेच्या वापरबाबतून शोडक्यात लिहा?

→ ऊर्जेची वाढती कमतरता हा एकविसाव्या शतकातील एक महत्त्वाचा मुद्दा बनलेला आहे. कोणत्याही देशाचा सर्वांगीण विकास हा मुख्य-त्वेकरून ऊर्जेच्या वापराने अवलंबून असतो. दळणवळण, उद्योगधंदे तसेच मूलभूत सेवांच्या वितरणीकरणाने जागतिक अर्थव्यवस्थेमध्ये ऊर्जा महत्त्वाची भूमिका पार पाडते.

ऊर्जेचे स्रोत मुख्यत्वे दोन प्रकारचे असू शकतात.

पुनर्निर्मितीक्षम ऊर्जा संसाधने/ पर्थायी ऊर्जा संसाधने	अपुनर्निर्मितीक्षम ऊर्जा संसाधने
---	-------------------------------------

1) पुनर्निर्मितीक्षम ऊर्जा संसाधने - ही संसाधने निसर्गमध्ये सतत निर्माण केली जातात आणि अशी ऊर्जा संसाधने अप्रत्यक्ष ऊर्जासंसाधने समजली जातात. सौर ऊर्जा, लाकूड, पवन ऊर्जा, समुद्री लाटांपासून तयार होणारी ऊर्जा, जैव ऊर्जा, भू-आण्विक ऊर्जा आणि हायड्रोजनपासून तयार होणारी ऊर्जा यांच्या यामध्ये समावेश होतो. ही ऊर्जासंसाधने पुन्हा पुन्हा वापरता येऊ शकतात.

2) अपुनर्निर्मितीक्षम ऊर्जा संसाधने - (पर्थायी)  
ही संसाधने लाखो वर्षांच्या घडामोडींद्वारे निसर्गमध्ये तयार झालेली आहेत आणि त्यांचा झय आल्यास निसर्गमध्ये ही ऊर्जासंसाधने त्वरित उपलब्ध होऊ शकत नाहीत. कोळसा, पेट्रोलियम, नैसर्गिक वायू आणि आण्विक ऊर्जा अं यांच्या यामध्ये समावेश होतो.

प्रत्येक ऊर्जा संसाधनांच्या वापरामध्ये काही दराविक वॅशिफ्ये असून त्यावरच त्यांच्या वापर आणि योग्य उपयोग कसा करवण्याचे ठरते.

प्राथमिक उर्जा व त्यांच्या वापर फुटीलपुढाणे -

1) पवन ऊर्जा - पवनचक्कीद्वारे पवनऊर्जा उत्पादन केली जाते. पवनचक्कीमध्ये असणाऱ्या पात्यांना वाऱ्यामुळे वाती निर्माण होते व पात्यांच्या चक्राकार फिरण्यामुळे टर्बाइनद्वारे विद्युत ऊर्जा निर्माण केली जाते. यांच्या वापर मुख्यत्वेकरून पाण्याच्या उपसा करण्यासाठी, पीठाची गिरण चालविण्यासाठी आणि काही प्रमाणात प्रकाश मिळविण्यासाठी केला जातो. पवनचक्कीची मोठ्या प्रमाणात उभारणी केली जाते तेव्हा त्यास विंड फार्म असे म्हणतात. पवनऊर्जा ही खूप उपयुक्त तर आहेच शिवाय यापासून कुठल्याही प्रकारचे प्रदूषण होत नाही.

2) जलविद्युत - पाण्यामध्ये असणारी ऊर्जा संचयित करून वापरली जाऊ शकते. नदीचे वाहते पाणी मोठ्या चरणाची बांधणी करून अडविले जाते व त्याची साठवणूक केली जाते. नंतर मोठ्या उंचीवरून टर्बाइन्स फिरविण्यासाठी वापरले जाते. पाण्याचे वस्तुमान हे हवेपेक्षा आठशे पटीने जास्त असल्याने हळू वाहणारे पाणीसुद्धा जास्त प्रमाणात विद्युत उर्जेची निर्मिती करू शकते.

3) सागरी लाटांपासून मिळणारी ऊर्जा - सागरांमध्ये निर्माण होणाऱ्या लाटांपासून ऊर्जा निर्मिती केली जाते. भरती व ओढेही यांच्या लाटांमधील उंचीचे अंतर हे यासाठी काही मीटर्समध्ये असावे लागते, त्याद्वारे टर्बाइन्स फिरविले जातात. अनेक ठिकाणी व्यावसायिक तत्वावर आज लाटांपासून ऊर्जा निर्मिती केली जाते. उंच लाटांच्या शक्तीवर फिरणारे टर्बाइन्स हेटलहान आकाराचे असतात.

- 4) सौर ऊर्जा - सौर ऊर्जा म्हणजेच सूर्यप्रकाशापासून मिळणारी ऊर्जा होय. या सौर ऊर्जेचा वापर विविध प्रकारे केला जाऊ शकतो.
- 1) घरगुती वापरासाठी पाणी तापवणे.
  - 2) अवकाशात असणाऱ्या उपग्रहांना सौर ऊर्जेद्वारे विद्युत ऊर्जा पुरविणे.
  - 3) इमारतीचे योग्य बांधकाम करून जास्तीत जास्त सूर्यप्रकाश पोहचविणे.
  - 4) फोटोव्होल्टाइक सौर सेलसचा वापर करून विद्युत ऊर्जा निर्माण करणे.
  - 5) सौर चिमणीद्वारे हवा थंड व गरम करणे.
  - 6) सौर ऊर्जेचे उष्णतेत रूपांतर करून अन्न शिजविणे.
  - 7) सौर ऊर्जेचा वापर करून त्याचा उपयोग शीतकरणासाठी करणे.
- \* सौरऊर्जेवर आधारित काही महत्त्वाची उपकरणे आहेत.  
उदा. सौर ऊर्जेचे उष्णतेत नि रूपांतर करणारे घटक, सौरसेल, सौर कुकर, सौर बंब, सौर विद्युत प्रकल्प, सौर झट्टी.

5) इव जैवइंधने - इव जैवइंधनात ईथॅनॉल, जैविक डिझेल किंवा वनस्पतीपासून काढलेले तेल यांच्या समावेश होतो. याच्या किंवा कोणत्याही बदनाशिवाय आजकालच्या आधुनिक वाहनांत जैव डिझेलचा वापर केला जाऊ शकतो. जैविक डिझेल-द्वारे कमीत कमी प्रमाणात प्रदुषके हवेत सोडली जातात. त्यामुळेच जास्तीत जास्त दळणवळणाच्या वाहनामध्ये इव इंध-नांचा वापर दिसून येतो.

6) जैववस्तुमालीय ऊर्जा - हिरव्या वनस्पती व प्राणी यांच्या-पासून सैद्धीय व विघटनशील अशा घटकांपासून ऊर्जा निर्मिती करता येते. त्यास जैववस्तुमालीय ऊर्जा असेही म्हणतात. यामध्ये कृषी जैववस्तुमालीय ऊर्जेच्या समावेश होतो. लाकूड आणि त्यापासून मिळणाऱ्या दुय्यम उत्पादनांचा वापर करून इंधने बनवली जातात. यामध्ये ईथॅनॉल, मिथॅनॉल, जैववायू, आणि बूडगॅस यांच्या समावेश होतो.

१) जैविक वायू आणि विलोक्सीडवसनाश्चारे दोनारे विघटन -  
जैविक वायूत मिथेन, कार्बनडाय ऑक्साईड, हायड्रोजन  
आणि हायड्रोजन सल्फाईड यांचे मिश्रण असते. मिथेन हा  
जैविक वायूतील मुख्य घटक आहे. हा वायू प्रदूषकविरहित, स्वच्छ  
आणि कमी खर्चात निर्माण करता येतो. आपल्या देशात वापरल्या  
जाणाऱ्या जैविक वायू प्रकल्पात मुख्यत्वे दोन प्रकार पडतात.

i) तरंगत्या साठवण टाकीच्या प्रकार

ii) कायमस्वरूपी पक्क्या साठवण टाकीच्या प्रकार.

8) भू-औष्णिक ऊर्जा - पृथ्वीच्या कित्येक किलोमीटर खोलवरील  
अंतर्भागातील उष्णतेच्या वापर भू-औष्णिक ऊर्जा म्हणून केला  
जातो. भू-औष्णिक उष्णतेच्या वापर मुख्यत्वेकरून तीन प्रकारे  
केला जातो. पहिल्या प्रकारात पृथ्वीच्या अंतर्भागातील कोरड्या  
वाफेच्या वापर टर्बाइन्स फिरविण्यासाठी केलेल्या जातो. दुसऱ्या प्रकारात  
पृथ्वीच्या अंतर्भागातील अतिगरम पाणी, ज्याचे तापमान हे 200  
अंश सेल्सियसपेक्षाही जास्त असते, त्याच्या वापर टर्बाइन्स फिरव-  
ण्यासाठी केला जातो. तर तिसऱ्या प्रकारात गरम पाणी इतर इव  
रासायनिक पदार्थांना ठकळण्यासाठी वापरले जाते आणि टर्बाइन्स  
फिरविले जातात.

9) हायड्रोजन - अनिउच्च प्रमाणात ऊर्जा असल्याने हायड्रोजन  
हे एक उत्तम इंधन म्हणून वापरले जाऊ शकते. ग्रामध्ये 150  
किलो ज्यूस प्रति कॅस इतकी ऊर्जा असते. हायड्रोजन खालील  
तीन प्रकारे उत्पादित केला जातो.

अ) पाण्याचे 3000 केल्विन इतक्या तापमानास औष्णिक  
विलगीकरण.

ब) पाण्याची इतर रासायनांशी रासायनिक अभिक्रिया करून.

क) विद्युत ऊर्जेच्या वापर करून पाण्यातील हायड्रोजन आणि  
ऑक्सिजन वेगळे करणे.

3) दीप लिहा.

1) सागरी प्रदूषण.

→ पृथ्वीच्या एक तृतीयांश पृष्ठभागा हा महासागराने व्यापलेला आहे. पृथ्वीवरील रासायनिक व जैविक घटकांच्या समतोलसाठी महासागर महत्त्वाची भूमिका पार पाडतात. आपले अन्नसंसाधन, व्यापार उद्योग आणि दूषणवळणासाठी महासागर उपयोगी पडतात. सध्याच्या परिस्थितीत मानवनिर्मित कारणांमुळे सागरी प्रदूषणाच्या रूपाने महासागर च्या संसाधनाचा प्हास होत आहे.

व्याख्या - सागरी पाण्यामध्ये मानवी क्रियेद्वारे किंवा नैसर्गिक प्रक्रियेद्वारे रासायनिक, भौतिक आणि जैविक गुणधर्म होणाऱ्या बदलास सागरी प्रदूषण म्हणतात.

सागरी प्रदूषणाची कारणे -

1) उद्योगधंदे - समुद्र किनाऱ्यावर असलेल्या विविध उद्योगधंद्यांमुळे प्रत्यक्ष किंवा अप्रत्यक्षरित्या अनेक विषारी रसायने असलेले टाकाऊ पाणी समुद्रात सोडले जाते. यामुळे सागरी प्रदूषण वाढते.

2) दारुगुती कचरा - जगातील सर्वात जास्त लोकसंख्या समुद्रकिनाऱ्यावर लहान गावे किंवा शहरांच्या रूपाने वसलेली आहे. त्यामुळे तयार होणारा सर्व कचरा / टाकाऊ पाणी समुद्रात सोडून दिले जाते.

3) शेतीमधून वाहत येणारे सांडपाणी - शेतीमध्ये वापरली जाणारी विविध प्रकारची कृषी रसायने, खते, किटकनाशके पाण्याबरोबर किंवा नदीच्या प्रवाहाबरोबर समुद्रात वाहत येतात. व सागरी प्रदूषण होण्यास कारणीभूत ठरते.

४) तेल गळती - समुद्रातील तेलगळतीस कारणीभूत असणारे घटक म्हणजे तेलवाडू जहाजांचे अपघात, तेलवाडू वाहने घुणे, तेल शुद्धीकरण केंद्रातून वाहून येणारे पाणी, मोठमोठ्या पाईपलाईनमधून होणारी तेल गळती, इ. आहेत.

५) अविघटनशील कचरा - भासेमाशीसाठी वापरण्यात येणाऱ्या प्लॅस्टिकच्या जाळ्या, प्लॅस्टिकच्या वाट्या, प्लॅस्टिकच्या पिशव्या, काचेचे तुकडे, इ. वस्तूंच्या रासायनिक घटकांमुळे समुद्रात अशा वस्तूंचे विघटन लवकर होत नाही.

साठारी प्रदूषणाचे परिणाम -

- १) शहरातील मैलायुक्त सांडपाणी यामुळे पाण्यातील प्राणवायू कमी होतो. यामुळे समुद्रातील जैवविविधतेस धोका निर्माण होतो व विविध रोगांच्या प्रसार होतो.
- २) सांडपाण्यामध्ये असलेली अपमार्जके आणि रासायनिक खतांच्या अंश यामुळे हरितशैवालाचे प्रमाण वाढते व प्राणवायुविरहित वातावरण निर्माण होते.
- ३) रासायनिक किटकनाशके जसे की डीडीटी, बीएचसी, पाय्नासारखे धातू अन्नसाखळीत प्रवेश करतात ज्यांचे पुढे जैवसंचयन होते.
- ४) तेलगळतीमुळे तेलाचे तंबू पाण्यावर निर्माण होतात. त्यामुळे सूर्यप्रकाश तळशी पोहचू शकत नाही आणि जलचर जुद्धमरुतनमत्ता.
- ५) अविघटनशील प्लॅस्टिक जाळ्या, दोऱ्या, पिशव्या, अमकील, इ. घटकांमुळे जलचरांच्या हालचालींमध्ये अडथळ निर्माण होतो.

साठारी प्रदूषणनिवारणाचे उपाय -

- १) शहरी मैलायुक्त सांडपाणी व कारखान्यातील सांडपाण्यावर प्रक्रिया करणे व त्यानंतरस्य ते समुद्रात सोडणे बंदी करावे.
- २) अविघटनशील पदार्थ समुद्रात टाकण्यावर बंदी करावी.
- ३) तेलाची वाहतूक करताना योज्य ती काळजी घेणे गरजेचे आहे.
- ४) औष्णिक ऊर्जा केंद्रातून बाहेर सोडल्या जाणाऱ्या गरम पाण्याच्या पुनर्वापर व पुनःप्रक्रिया करणे आवश्यक आहे.

- 3) जहाजांमध्ये तलास्त पाणी वापरण्यावर बंदी करावी.
- 4) वाहने घुणे किंवा पार्श्वलाईनमधुल होणाऱ्या तेलवाळतीवर उपाययोजना करावी.
- 5) समुद्र किनाऱ्यासाठी अस्सलारे कायदे (रहते) किंवा कायद्याखाली इतर तरतुदीनुसार समुद्रकिनाऱ्याचे संरक्षण करणे महत्वाचे आहे.



जयसिंगपुर कॉलेज जयसिंगपुर.

नाव :- शिवम अनिल गवळी

विषय :- पर्यावरण

रोल नं :- 999

वर्ग :- बी - कॅम्प :- II

विषय शिक्षक :- महामुलकर सैदम



2

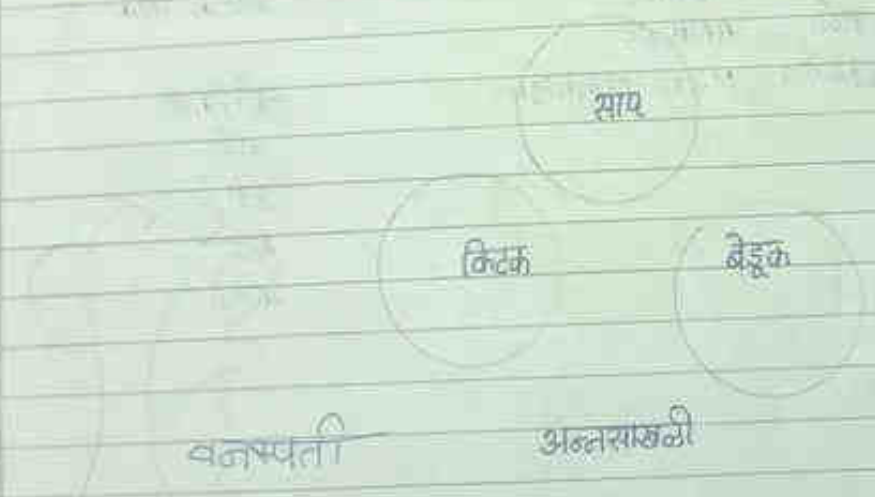
परिसंस्थेतील वनस्पती व प्राणी यांच्यातील वैशिष्ट्यपूर्ण संबंधास 'परिसंस्था' म्हणतात असे म्हणतात.

Functions of an Ecosystem - परिसंस्थेची कार्ये

- I] Food chain - अन्न साखळी
- II] Food web - अन्न जाळी
- III] Trophic structure - वर्ग विनियम स्तर

अन्न साखळी :-  
एका परिसंस्थेत एकमेकांना अन्न देणारे व विविध प्रकारच्या अन्नसाखळ्या असू शकतात.

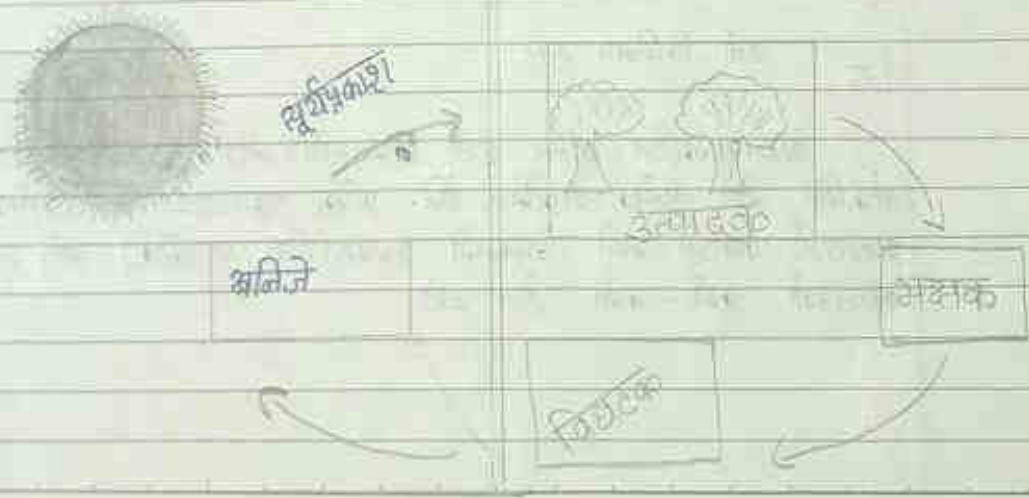
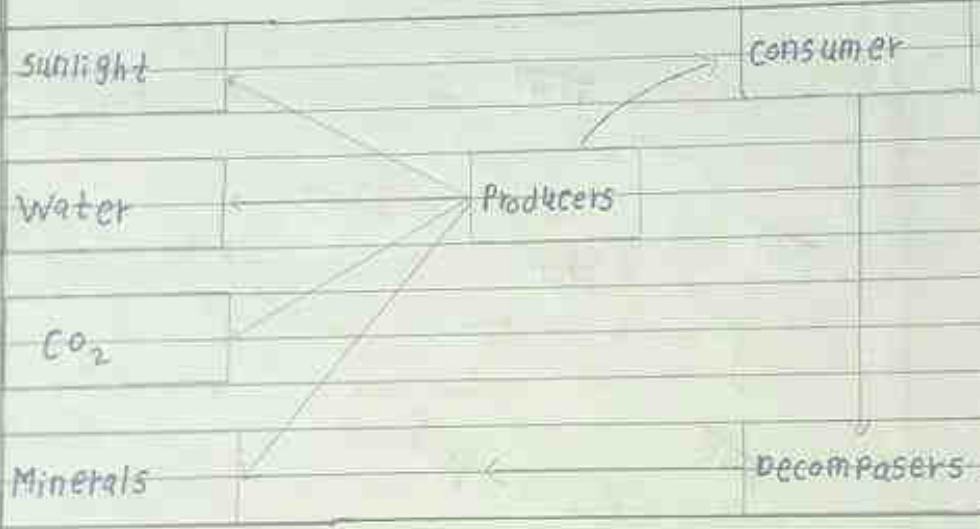
एका विनियम स्तरापासून दुसऱ्या विनियम स्तराकडे अन्न उर्जेचे संक्रमण होत जाते त्यास अन्नसाखळी म्हणतात.  
वनस्पतीवर शाकाहारी प्राणी जगातात. शाकाहारी प्राण्यांना मांसाहारी प्राणी खातात. वनस्पती शाकाहारी प्राणी व मांसाहारी प्राणी हे अन्नासाठी परस्परांवर अवलंबून राहतात. त्यासाठी ते एकमेकांना जोडले गेलेले असतात.



व्याख्या :- "सजीव व त्यांचे वस्तीस्थान यांची एकत्रित संरचना म्हणजे परिसंस्था होय"  
 पर्यावरणातील सजीव व त्यांच्या सानिद्वयत्वातील अजैविक घटक एकत्रित एकत्रीकरणे निरवृत्त असून त्यांच्या परस्पर संबंधात परिसंस्था म्हणतात.

परिसंस्थेची रचना

Structure of an Ecosystem:-



## II] अन्नजाती

अन्नशाखण्यांच्या परस्परसंबंधाने अनुबद्धित झालेल्या जातीस 'अन्नजाती' म्हणतात.

विविध प्रकारचे सजीव विविध उर्जा विनिमय स्तराची जेवलेले असतात, की ज्यामुळे प्रत्येक उर्जा विनिमय स्तरावर उत्पादक आणि उपभोक्ते अनेक पर्याय उपलब्ध असतात. भासा अन्नजाती म्हणतात.

### अन्नजाती



### III] उर्जा विनिमय स्तर

अन्नशाखणीत अन्न उर्जा निम्नस्तरीय जीवांकून उच्चस्तरीय जीवांकडे अक्रमित होते. प्रत्येक अक्रमित होते. प्रत्येक सक्षमताच्या वेळी प्रत्येक पातळीवर अन्नउर्जा वापरली जाते. नसजसे उच्चस्तरीय पातळीकडे जावे तसतशी अन्नउर्जा कमी-कमी होत जाते.

पहिला उर्जा विनिमय स्तर  
हरित वनस्पती

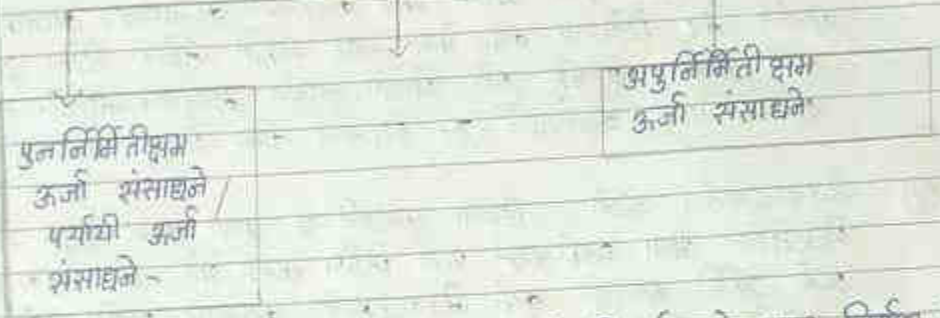
दुसरा उर्जा विनिमय स्तर  
नृणभक्षक

तिसरा उर्जा विनिमय स्तर  
मांसभक्षक

चतुर्थ उर्जा विनिमय स्तर  
उच्च मांसभक्षक

पाचवा उर्जा विनिमय स्तर  
विघटकांचा स्तर

ऊर्जेच्या स्रोतांचे प्रकार कोणते? पर्यायी ऊर्जेच्या वापराबद्दल चोडक्यात विद्या?   
 → ऊर्जेची वढती कमसता हा एकविसाव्या शतकातील एक महत्त्वाचा सुद्धा बनलेला आहे. कोवत्याही देशाच्या सर्वांगीण विकास हा मुख्यत्वेवरून ऊर्जेच्या वापरावर अवलंबून असतो. दळतावकठा, उद्योगांमध्ये तसेच सुलभूत सेवांच्या वितरणीकरणा जागतिक अर्थव्यवस्थेत मध्ये ऊर्जा महत्त्वाची भूमिक पार पडते.   
 ऊर्जेचे स्त्रोत मुख्यत्वे दोन प्रकारचे असू शकतात.



① पुनर्निर्मितीसम ऊर्जा संसाधने :- ही संसाधने निसर्गामध्ये सतत निर्मिती केली जातात. आणि अशी ऊर्जा संसाधने अक्षय ऊर्जा संसाधने समजली जातात. सौर ऊर्जा, लावूड, पवन ऊर्जा, समुद्री लावपासून तयार होवारी ऊर्जा, जैव ऊर्जा, भू-शौणिक ऊर्जा ह्यामद्वारे जन्मपासून तयार होवारी ऊर्जा यांचा मांसमध्ये समावेश होतो. ऊर्जासंसाधने पुन्हा पुन्हा वापरता येऊ शकतात.

② अपुनर्निर्मितीसम ऊर्जा संसाधने :- ही संसाधने लाखो वर्षांच्या घडामोडींद्वारे निसर्गामध्ये तयार झालेली आहेत आणि त्यांच्या शय झाल्यास निसर्गामध्ये तयार झालेली आसल्यास निसर्गामध्ये ही ऊर्जासंसाधने त्वरित उपलब्ध होऊ शकत नाहीत. कोळसा, पेट्रोलियम, नैसर्गिक वायू आणि आण्विक ऊर्जा यांच्या मध्ये समावेश होतो.

③ सौर ऊर्जा :- सौर ऊर्जा म्हणजेच सूर्यप्रकाशापासून मिळवारी ऊर्जा होय. या सौर ऊर्जेचा वापर विविध प्रकारे केला जातो.

- ① घरगुती वापरामाठी पाणी तापवणे.
- ② उष्णकाशात असणाऱ्या उपग्रहांना सौर उर्जेद्वारे विद्युत उर्जा पुरविले.
- ③ फोटोव्होल्टाईक सौर सेलच्या वापर करून विद्युत उर्जा निर्मिती करतो.

सौर चिमणी इवारे ह्या ग्रंथ व गरम करणे.  
सौरऊर्जेवर आधारीत काही महत्त्वाची उपकरणे आहेत. उदा., सौर उर्जेचे उष्णतेत उपांतर करणारे घटक, सौरसेल, सौर कुकर, सौर बंद, सौर विद्युत प्रकल्प, सौर झरती.

8) इव जैवइंधने :- इव जैवइंधनात ईथॅनॉल, जैविक डिझेल किंवा वनस्पतीपासून काढलेले तेल यांचा समावेश होतो. थोड्या किंवा कोठालाही बदलाशिवाय आजकाल आधुनिक वटनांत जैव डिझेलचा वापर केला जाऊ शकतो. जैविक डिझेल इवारे कमीत कमी प्रमाणात प्रदुषणे होते शोधली जातात. त्यामुळेच जाहीत जास्त इंधनावनाच्या वटनांसहजे इव इंधनांचा वापर दिवून येतो.

9) जैववस्तुमानाची ऊर्जा :- हिल्या वनस्पती व प्राणी यांच्या पासून सेड्रिय व विघटनशील अशा घटकांपासून ऊर्जा निर्मित करता येते त्यास जैववस्तुमानाची ऊर्जा असेही म्हणतात. कृषी जैववस्तुमानाची कचऱ्याचा समावेश होते. यातहजे ईथॅनॉल, मिथॅनॉल, जैववायू, आणि वूडगॅस यांचा समावेश होतो.

10) जैविक वायू आणि विनॉक्सीस्वसनाइवारे होणारे विघटन :- जैविक वायूत मिथेन, कार्बोनाइयडऑक्साईड, हायड्रोजन आणि हायड्रोनिनल सल्फाईड यांचे मिश्रण असते. मिथेन हा जैविक वायूतील मुख्य घटक आहे. हा वायू प्रदुषकविरहित, तः स्वच्छ आणि कमी खर्चात निर्माण करता येतो.

11) तरंगत्या साठवण हाकीचा प्रकार  
12) कायमास्वतपी पक्क्या साठवण हाकीचा प्रकार.

13) शु - औष्णिक ऊर्जा :- पृथ्वीच्या कित्येक किलोमीटर खोलवरील अंतर्भागातील उष्ण तेज वापर शु - औष्णिक ऊर्जा म्हणून केला जातो. दुसऱ्या प्रकारात पृथ्वीच्या अंतर्भागातील ज्वलनशील पाणी, ज्याचे तापमान 200 अंश सेल्सियसपेक्षा जास्त असते. त्याचा वापर हर्वाइन्स फिरवण्यासाठी केला जातो. शु - औष्णिक उष्णते वापर मुख्यत्वेकरून तीन प्रकारे केला जातो. तर तिसऱ्या प्रकारात गरम पाणी इतर इव रासायनिक पदार्थांचा उकळवण्यासाठी वापरले जाते आणि हर्वाइन्स फिरवले जाते.



हायड्रोजन :- अतिउच्च प्रमाणात ऊर्जा असल्याने हायड्रोजन हे एक उत्तम इंधन म्हणून वापरले जाऊ शकते. यामध्ये 150 किलो ग्रॅम प्रति घोंग इतकी ऊर्जा असते. हायड्रोजन खालील तीन प्रकारे उत्पादित केला जातो.

- [अ] पाण्याचे 3000 केल्विन इतक्या तापमानास औष्णिक विभंगीकरण.
- [ब] पाण्याची इतर रासायनांची रासायनिक अभिक्रिया करून.
- [क] विद्युत ऊर्जेचा वापर करून पाण्यातील हायड्रोजन आणि ऑक्सिजन वेगळे करतो.

इत्येक ऊर्जा संसाधनांच्या वापरामध्ये काही ठराविक वैशिष्ट्ये असून त्यावरच त्यांचा वापर आणि योग्य उपयोग कसा करावया हे ठरते.

पर्यायी ऊर्जा व त्यांचा वापर पुढीलप्रमाणे :-

- ① पवन ऊर्जा :- पवनचक्कीद्वारे पवनऊर्जा उत्पादित केली जाते. पवनचक्कीमध्ये असणाऱ्या पात्यांना वाऱ्यामुळे गती निर्माण होते व पात्यांच्या चक्राकार फिरवामुळे टर्बाईनद्वारे विद्युत ऊर्जा निर्माण केली जाते. यांचा वापर मुख्यत्वेकरून पाण्याचा उपसा करव्यासाठी, पीठाची गिरवा चालविण्यासाठी आणि काही प्रमाणात प्रकाश मिळविण्यासाठी केला जातो. पवनचक्कीची मोठ्या प्रमाणात उभारणी केली जाते तेव्हा त्यास विंड फार्म असे म्हणतात. पवनऊर्जा ही खूप उपयुक्त तर असेच शिवाय वापरासून कुठल्याही प्रकारचे प्रदूषण होत नाही.
- ② जलविद्युत :- पाण्यामध्ये असणारे ऊर्जा संचयित करून वापरली जाऊ शकते. नदीचे वाहते राहिले मोठ्या धरणाची बांधणी करून अडविले जाते व त्याची साठवणूक केली जाते. नंतर मोठ्या उंचीकरून टर्बाईन्स फिरविण्यासाठी वापरले जाते. पाण्याचे वस्तुमान हे हवेपेक्षा आठवे पटीने जास्त असल्याने हवू वाहणारे पाणीसुद्धा जास्त प्रमाणात विद्युत उर्जेची निर्मिती करू शकते.
- ③ सागरी लाटांमधून मिळवारी ऊर्जा :- सागरीमध्ये निर्माण होणाऱ्या लाटांमधून ऊर्जा निर्मिती केली जाते. इतर व असेही यांच्या लाटांमधील उंचीचे अंतर हे यासाठी काही मीटरमध्ये असणे लागते, त्याद्वारे टर्बाईन्स फिरवले जातात.

अनेक ठिकाणी व्यावसायिक तत्वावर आज लागूपासून उर्जा निर्मिती केली जाते.  
उच्च जगांच्या शक्तीवर फिरवारे टर्बाइन्स हे लहान आकाराचे असतात.

सागरी प्रदूषण

पृथ्वीचा एक तृतीयभाग पृथ्वीपृष्ठावरील महासागरांनी व्यापलेला आहे. पृथ्वीपृष्ठीय रसायनिक व जैविक घटकांच्या समतोलामधील महासागर महत्त्वाची भूमिका गर पाडतात. आपले अन्नसंसाधन, व्यापार उद्योग आणि दळणवळणासाठी महासागर उपयोगी पडतात. जहाजांच्या परिस्थितीत मानवनिर्मित कारणांमुळे सागरी प्रदूषणाच्या रूपात महासागर या संसाधनाचा हास होत आहे.

सागरी प्रदूषणाचे परिणाम

शहरातील मैलांभूत सांडपाणी यामुळे पाण्यातील प्राणवायू कमी होतो. कमी झालेल्या प्राणवायूमुळे समुद्रातील जैवविविधतेस धोका निर्माण होतो. अतिघटनशील प्लास्टिक जाळ्या, लेन्चा, पिशव्या, प्रार्मोकोल, इत्यादी बटकांमुळे जहाजरांच्या हालचालीसहजे अडथळा निर्माण होतो.

सागरी प्रदूषणाचे निवारणाचे उपाय :

शहरी मैलांभूत सांडपाणी व कारखान्यातील सांडपाण्यावर प्रक्रिया करणे व त्यानंतरच ते समुद्रात सोडणे गरजेचे आहे.

अतिघटनशील पदार्थ समुद्रात टाकण्यावर बंदी करावी.

तेसाची वाहतूक करतांना योग्य ती काळाची वेळी गरजेचे आहे.

औद्योगिक ऊर्जा केंद्रातून बाहेर सोडल्या जाणाऱ्या गरम पाण्याचा पुनर्वापर व पुनर्प्रक्रिया करणे आवश्यक आहे.

जहाजासहजे खलास पाणी वापरण्यावर बंदी करावी.

बाहेर धुणे किंवा पाईपलाईन मधून होणाऱ्या तेलगळतीवर उपाययोजना करावी.

समुद्र किनाऱ्यासाठी असलेले कामे (CRZ) किंवा कायद्याच्या इतर तरतुदीनुसार समुद्र किनाऱ्याचे संरक्षण करणे महत्त्वाचे आहे.

सागरी प्रदूषणाची कारणे :

उद्योगधंदे :- समुद्र किनाऱ्यावर असलेल्या विविध उद्योगधंद्यांमुळे प्रत्यक्ष किंवा अप्रत्यक्षरित्या अनेक विषारी रसायने असलेले टाकाऊ पाणी समुद्रात सोडले जाते.

- (C) घरदुती कचरा :- जगातील सर्वात जास्त लोकसंख्या समुद्रकिनार्यावर राहणारे आहेत. किती शहरांच्या रूपात वसलेली आहेत.
- (D) शेतीमधून वाहत येणारे सांडपाणी :- शेतीमध्ये वापरली जाणारी विविध प्रकारची कृषी रसायने, खते, किटकनाशके फव्वाबरोबर किती तरीच्या प्रवाहाबरोबर समुद्रात वाहून येतात.
- (E) औद्योगिक ऊर्जा केंद्रांमुळे होणारे प्रदूषण :- वीज निर्मिती करणाऱ्या प्रकल्पांना यंत्र समुहणी थंड करायसाठी मोठ्या प्रमाणावर पाण्याची गरज असते.
- (F) तेल गळती :- समुद्रातील तेलगळतीस कारणीभूत असणारे घटक म्हणजे तेलवाहू जहाजांचे अपघात, तेलवाहू वाहने घुणे, तेल शुद्धीकरणा केंद्रातून वाहत येणारे पाणी मोठमोठ्या पाईपलाईनमधून होणारी तेल गळती, इत्यादी आहेत.
- (G) बलास पाणी :- समुद्रात जहाजांचा समतोल राखण्यासाठी त्यामध्ये समुद्राचे पाणी असते जाते.

# Field Visit

# JAYSINGPUR COLLEGE, JAYSINGPUR

## Department of Botany

### Industrial Visit to Oasis Biocontrol Lab

## Visit Report

Date: 10<sup>th</sup> March 2021

The students of class B. Sc. III Botany visited Oasis Bio-control Lab, Shirol on 10<sup>th</sup> March, 2021. A total 19 students and two staff members were participated. The owner of lab Mr. Pravin Mali explained the effect of Bioproming on different crop plants; role of organic manure along with beneficial microbial cultures on plant growth, and antimicrobial effect of common medicinal plants. Also, he granted three research projects to students in collaboration with botany department. The students prepared the synopsis and submitted to Oasis Bio-control Lab and department of Botany. As per our synopsis proposal the owner has agreed to sanction seed money of Rs. 10,000/- to carry out the research work.





*M.V. Kale*  
Dr. M.V.Kale  
**Head**  
Department of Botany

Anekant Education Society's

**JAYSINGPUR COLLEGE, JAYSINGPUR**  
**Department of**  
**Botany**  
2020-21

**Research projects allotted to students in collaboration with Oasis Bio-control  
Laboratory, Shirol**

**List of students**

**A) Name of project- Effect of Bioproming on growth parameters of maize**

- 1) Mr. Shubham Arage
- 2) Mr. Omkar Kamble
- 3) Miss Saloni Patil
- 4) Miss Mohini Kamble
- 5) Miss Pooja Patil

**B) Name of project- Effect of organic manure enriched with beneficial microbial  
culture ontomato plantation in saline soil**

- 6) Miss Pratiksha S. Khadake
- 7) Miss Sifa S. Patel
- 8) Miss Muskan B. Patel
- 9) Miss Laxmi P. Bandgar
- 10) Miss Rutuja R. Patil
- 11) Miss Saba Patel

**C) Name of project-Antimicrobial and Insecticidal activity of some plant parts**

- 12) Miss Kshitija Syryavanshi
- 13) Miss Divya Narbal
- 14) Miss Nisha Mane
- 15) Miss Shraddha Patil
- 16) Miss Megha Bedge
- 17) Miss Poonam Potdar
- 18) Miss Sabiya Nadaf
- 19) Miss Mohini R. Kamble

  
Dr. M.V. Kale  
**Head**  
Department of Botany



Anekar Education Society's  
**JAYSINGPUR COLLEGE, JAYSINGPUR**  
DEPARTMENT OF GEOGRAPHY  
2020-21

**संज्ञक**

राज्यीय स्तर 2020-21 मध्ये जी.प. भाग तीन मधील विद्यार्थ्यांना पुस्तक शोधा-या मुळाव्याच्या अभ्यास करण्यासाठी सूचितवादी यथे मान सर्व साठी या गावाची निवड करण्यात आली होती. कारण या गावाला सर्वाधिक लक्षात घ्यायला येतला होता. हे ठिकाण आर्थिकदृष्ट्या खूप प्रसिद्ध असून या भागात मोठ्या प्रमाणावर व्यापारी वर्ग किंवा लहान - मोठे व्यवसायिक जायता व्यवसाय करताना त्यांच्या जीवनावर काय प्रकार लक्षात घ्यायला येतला आहे हे अभ्यासने प्र त्यांच्या समस्या जाणून घेण्यासाठी या गावाची निवड करून त्यातील साहेबी उरनावरी सावली विद्यार्थ्यांनी करून त्यांचा एक विस्तृत अहवाल मूळ विभागास बघावे आहे. यामध्ये सर्व घटकांचा अभ्यास करून त्यासाठी काही उपयोजन करण्यात येऊ शकते हे सुचविलेले आहे.



विभाग प्रमुख

मृगाक्षरान्न विनास  
जयसिंगपुर कॉलेज, जयसिंगपुर



Dr. M.V.Kale  
Dept. of Botany  
Jaysingpur College, Jaysingpur  
Date-9-3-2021

To  
The Principal  
Jaysingpur College, Jaysingpur

Subject- Permission to visit Oasis Laboratory, Shirol

R/Sir,

As per syllabus students of class B.Sc.III Botany wishes to visit Oasis Biocontrol Laboratory, Shirol on 10<sup>th</sup> March, 2021. The aim of this visit is to share collaborative research on projects for students. So I kindly request you to permit the visit.

Thanking you,

Permitted  
②③

*Kale*  
Dr. M.V.Kale  
**Head**  
Department of Botany

Dr. M.V.Kale  
Dept. of Botany  
Jaysingpur College, Jaysingpur  
Date-9-3-2021

To  
Mr. Pravin C. Mali  
Owner, Oasis Bio-control Lab. Shirol

Subject- Visit to your laboratory.

Sir,

As per syllabus students of class B.Sc.III Botany wishes to visit Oasis Biocontrol Laboratory, Shirol on 10<sup>th</sup> March, 2021. The aim of this visit is to share collaborative research on projects for students. So I kindly request you to allot the projects in collaboration with department of Botany JCU and your laboratory. On behalf of college I request you to provide seed money (funding) for the students.

Thanking you,

*M.V.Kale*

Dr. M.V.Kale

**Head**

**Department of Botany**

Received  
Mali  
15/03/2021

**Jaysingpur College, Jaysingpur**  
**Department of Botany**  
**2020-21**

**Research projects allotted to students in collaboration  
with Oasis Bio-control Laboratory, Shirol**

List of students-

**A) Name of project- Effect of Bioproming on growth parameters of maize**

- 1) Mr. Shubham Arage
- 2) Mr. Omkar Kamble
- 3) Miss Saloni Patil
- 4) Miss Mohini Kamble
- 5) Miss Pooja Patil

**B) Name of project- Effect of organic manure enriched with beneficial microbial culture on  
tomato plantation in saline soil**

- 6) Miss Pratiksha S. Khadake
- 7) Miss Sifa S. Patel
- 8) Miss Muskan B. Patel
- 9) Miss Laxmi P. Bandgar
- 10) Miss Rutuja R. Patil
- 11) Miss Saba Patel

**C) Name of project-Antimicrobial and Insecticidal activity of some plant parts**

- 12) Miss Ksitija Syryavanshi
- 13) Miss Divya Narbal
- 14) Miss Nisha Mane
- 15) Miss Shraddha Patil
- 16) Miss Megha Bedge
- 17) Miss Poonam Pootdar
- 18) Miss Sabiya Ndaf
- 19) Miss Mohini R. Kamble



Jale

**Head**  
**Department of Botany**



Agro Media group

# OASIS AGRO INDUSTRIES

Mfg. & Marketed of Agrochemical, Fertilizer, PGRs, Herbal Products & Organic Manure

Gut No. 994 Shirol, Tal. Shirol, Dist. Kolhapur, Pin 416 103 (MH) 9404987207 Email : pcmali211@gmail.com

BY hand

Date - 15/3/2021

To  
The Principal  
Jaysingpur College, Jaysingpur

Sub: Allotment of projects and funding for students.  
Ref: Your letter dated 9/3/2021

R/Sir,

As per your request the following projects were allotted to students of class B.Sc.III. The projects are to be carried out in collaboration with department of Botany JCI and Oasis bio-control laboratory. Also I am providing seed money (funding) of Rs. 10,000/- to carry out the projects. (Cheque No. 041458 dated 15/3/2021 Central Bank of India).

1. Effect of Bioproming on growth parameters of Maize
2. Antimicrobial and Insecticidal activities of some plant parts
3. Effect of organic manure enriched with beneficial microbial culture on tomato plantation in saline soil.

Thanking you,

*Malika*

Oasis Agro Industries,  
Oasis Bio-control Laboratory  
Shirol.



<b>Project Title</b>	Effect of Bio priming on Growth parameters of Maize.
<b>Introduction</b>	Beneficial microbes are applied to the soil and plant tissues directly or through seed inoculation, whereas soil application is preferred when there is risk of inhibitors or antagonistic microbes on the plant tissues. Insufficient survival of the microorganisms, hindrance in application of fungicides to the seeds and exposure to heat and sunlight in subsequent seed storage in conventional inoculation methods force to explore appropriate and efficient bacterial application method. Seed priming, where seeds are hydrated to activate metabolism without actual germination followed by drying, increases the germination, stand establishment and stress tolerance in different crops. Seed priming with living bacterial inoculum is termed as biopriming that involves the application of plant growth promoting rhizobacteria. It increases speed and uniformity of germination; also ensures rapid, uniform and high establishment of crops; and hence improves harvest quality and yield. Seed biopriming allows the bacteria to enter/adhere the seeds and also acclimatization of bacteria in the prevalent conditions. This review focuses on methods used for biopriming, and also the role in improving crop productivity and stress tolerance along with prospects of this technology. The comparison of methods being followed is also reviewed proposing biopriming as a promising technique for application of beneficial microbes to the seeds..
<b>Objective</b>	<ol style="list-style-type: none"> <li>1. To study the effect of bio-priming on the growth of Maize.</li> <li>2. To identify the most effective Bio-priming agent against Maize.</li> </ol>
<b>Methods and Materials</b>	<p>Different Microbial Culture-  <i>Trichoderma viride</i>  <i>Pseudomonas fluorescens</i>  Cow urine  Beejamrutham</p> <ul style="list-style-type: none"> <li>• BeejamruthmPreparation  WATER- 1 L  COW URINE- 0.25L  COW DUNG- 0.25kgs  CALCIUM-2.5gms  Container with capacity of 2L</li> </ul>
<b>Treatment</b>	T <sub>1</sub> . <i>Trichoderma viride</i> T <sub>2</sub> . <i>Pseudomonas fluorescens</i> T <sub>3</sub> . <i>Trichoderma viride</i> + <i>Pseudomonas fluorescens</i> T <sub>4</sub> . Cow urine T <sub>5</sub> . Beejamrutham T <sub>6</sub> . <i>Trichoderma viride</i> + <i>Pseudomonas fluorescens</i> + Beejamrutham T <sub>7</sub> . CONTROL

Maifre

<b>Project Title</b>	ANTIMICROBIAL AND INSECTICIDAL ACTIVITIES OF SOME PLANT PARTS.
<b>Introduction</b>	Biodiversity has serious economic and social benefits for any country, but very few countries in the world have done an inventory of their bio resources. It is still unknown what role many of plant species play in the environment and from natural product or in phytochemical point of view, it is unknown chemicals they may contain. Plant constitutes a very vital component of biodiversity, collectively referred 300000 plant species on earth have estimated. Although, it is represented by large number, only around 80000 plant species are used in traditional medicine and human health care. Over 6000 plant in India are used in traditional, folklore and herbal medicine, the Indian system of medicine has identified 1500 medicinal plants of which 500 are commonly used.
<b>Research Problem</b>	The present study is designed to extract some members of Amaryllidaceae family like <i>Garlic</i> ( <i>Allium sativum</i> ) Bulb oil extract and Lamiaceae family like <i>Rosemary Sp.</i> Leaf oil extract study their microbicidal and insecticidal properties
<b>Objective</b>	The overall aim of the current study is to extract, isolate and evaluate bioactive compounds from selected plant species Bulb and leaf part. <ol style="list-style-type: none"> <li>1. Survey and documentation of bioactive uses of <i>Garlic</i> (<i>Allium sativum</i>), And Lamiaceae family like <i>Rosemary Spices</i> local region.</li> <li>2. Extraction of leaf extract from selected species and their chemical characterization by using spectroscopic techniques</li> <li>3. Screening of phytochemical for their biological activity.</li> <li>4. Study of insecticidal properties of selected species.</li> <li>5. Estimation of mineral analysis of selected species.</li> </ol>
<b>Methods and Materials</b>	<ol style="list-style-type: none"> <li>1. Intensive and extensive explorations will be undertaken from local region to collect the material of the selected species.</li> <li>2. Extraction of oil from seeds of selected species by using different extraction methods. eg. Soxhlet extraction method</li> <li>3. Screening of phytochemical for their biological activity by using different bacteria and fungi isolated from field.</li> <li>4. Study of insecticidal properties of different insect pest in field</li> </ol>
<b>Treatment</b>	The extracted oil compound will be screened for antimicrobial and insecticidal activities.

Malye

<b>Project Title</b>	Effect of Organic Manure enriched with Beneficial Microbial culture on Tomato Plantation In Saline soil.
<b>Introduction</b>	Soil salinity problem due to heavy use Chemical Fertilizer, Pesticides and indiscriminate water irrigation . Soils his lost its Physical, Chemical and biological characters.
<b>Objective</b>	1. To determine the effect of organic compost enriched with beneficial microbial cultures on tomato ( <i>Lycopersiconesculentum</i> ) plant growth parameters in Saline soil. 2. To determine the effect of organic compost along with beneficial microbial cultures on tomato ( <i>Lycopersiconesculentum</i> ) plant yield parameters in saline soil.
<b>Methods and Materials</b>	A Pot culture experiment was conducted to study the "Effect of organic compost enriched with beneficial microbial culture on Tomato on Saline soil. ( <i>Lycopersiconesculentum</i> Mill.) in Dept. Of Botany , Jaysingpur Collage , Jaysingpur. And Oasis Bio-control Laboratory, Shirol. <b>1.Seedling Preparations:</b> The seedlings of tomato was obtained from local Nursery <b>2.Pot preparation:</b> Experiment was conducted in a completely randomised design. one month old seedlings were transplanted into pots (29x27 cm) containing Saline soil and organic compost in the ratio of 4Kg+300g. Each plant was transplanted in to the respective pot as per the experiment. All the plants were given water daily for two weeks and after that on every alternate days. The 24 pots were arranged in three rows <b>3.Beneficial Micro Organisms:</b> About 20 ml of Citiric Acid Organisms, EM Culture were added to the pot as per experiment and treatment structure. Microbial cultures were collected from Biofertilizers local laboratory.
<b>Treatment</b>	T <sub>1</sub> - Saline Soil+ <i>Lycopersiconesculentum</i> T <sub>2</sub> -Saline Soil + <i>Lycopersiconesculentum</i> + Organic compost. T <sub>3</sub> -Saline Soil + <i>Lycopersiconesculentum</i> + Vermicompost. T <sub>4</sub> - Saline Soil + <i>Lycopersiconesculentum</i> + Organic compost+ CAO T <sub>5</sub> - Saline Soil + <i>Lycopersiconesculentum</i> + Organic compost+ EM Culture. T <sub>6</sub> - Saline Soil + <i>Lycopersiconesculentum</i> + Organic compost+ CAO+ PSB T <sub>7</sub> -Saline Soil + <i>Lycopersiconesculentum</i> + Organic compost+ EM Culture+ PSB T <sub>8</sub> -Saline Soil+ <i>Lycopersiconesculentum</i> + Organic compost+ CAO + EM Culture +PSB.

*Malika*



# MOU/ Internship

## SHRI BHARAT URBAN CO-OP BANK LTD., JAYSINGPUR



Head Office, 8<sup>th</sup> Lane, Azad Road,  
Jaysingpur-416101, Tal - Shirol, Dist - Kolhapur  
Phone No. (02322) 225722, 229923  
Fax No. (02322) 225723 E-mail - shribharatbankjsp@rediffmail.com

No. HO/ /2015-16

Date :- 27.05.2015

### MORANDUM OF UNDERSTANDING (MoU) (For UGC Course: B.Voc. in Financial Markets & Services)

**Preamble :-** The UGC, New Delhi of Ministry of HRD, GOI, New Delhi has launched Skills Development Programme in Higher Education in India. Since 2013-14 the UGC has introduced several schemes under the skill development programme to be introduced in universities and colleges in India. Presently the UGC has launched the Scheme of Community College (2013), the scheme of B.Voc. (Bachelor of Vocation) (2014) and scheme of Pandit Din Dayal Upadhyay KAUSHAL (2015), Pursuant to the introduction of the above mentioned schemes Jaysingpur College of Arts, Commerce & Science, run by Anekant Education Society, Baramati has submitted various proposals under the above mentioned schemes of UGC for Skill development. As per the information provided with by the Jaysingpur College, one of such courses, proposed to be introduced/being introduced is B.Voc. in Financial Markets & Services. As per the built-in-scheme of the UGC, the entire course must focus mainly on 'On the Job Training'.

Pursuant to these requirements, Jaysingpur College approached to various related establishments to be associated with/as industry partners' for providing necessary assistance, guidance, counseling, 'On the Job Training' continuous evaluation, certification and finally placements of the students who complete the course successful. We the undersigned are dealing in/having establishment providing services in the related areas of Financial Markets & Services, etc.. Pursuant to the invitation of Jaysingpur College, Jaysingpur we have the pleasure to be associated with and work as the industry partner (as per the description given in the UGC Regulations) provided in the guidelines) and therefore voluntarily & enthusiastically enter into a Memorandum of Understanding as per following details/Provisions.

- 1) That the industry partner will participate in Curriculum Design of the above mentioned course.
- 2) The industry partner will provide necessary assistance, guidance and counseling, in running the above mentioned course meaningfully and effectively.
- 3) The industry partner shall provide necessary times lot, avenues for the 'On the Job Training' of for the students of the above mentioned course.
- 4) That the industry partner shall provide the avenues for internship for the students of the above mentioned course.
- 5) That the industry partner shall as per the time table/programme of the college, evaluate the performance of the students of the above mentioned course.
- 6) That the industry partner shall, as per the time table/course programme, shall provide expertise and faculty for teaching, training and evaluation of the students of the above mentioned course.
- 7) That the industry partners shall make an endeavour to provide necessary up-dates, recent changes, developments in the field and shall also provide the necessary literature, brochures, various reports (made publically available) to the College for continuous updating the curriculum design.
- 8) That the industry partner shall actively participate in the placements of the students who complete the course and if possible shall also provide jobs in the establishments having regard to the suitability of the candidate.
- 9) That the industry partner shall provide necessary assistance, guidance counseling to the students, completing the course for self employment.

Now this MOU is hereby executed duly signed by both parties under their seal & signature on Day of the Month May in the year 2015.



*[Signature]*

**PRINCIPAL**  
Jaysingpur College, Jaysingpur

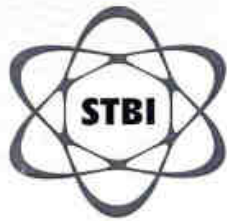


For Shri Bharat Urban Co-op. Bank Ltd; Jaysingpur

*[Signature]*  
**Chief Executive Officer**

*[Signature]*  
**Chairman**

**AGREEMENT OF PARTNERSHIP  
SAMRUDDHI TBI FOUNDATION  
AND  
PARTNERING INSTITUTE  
FOR JOINT NURTURING OF ENTREPRENURSHIP  
AND  
CREATING A COMPLETE ECO SYSTEM FOR TECHNOLOGY START UPS**



**SAMRUDDHI TBI  
FOUNDATION**  
Nurturing Entrepreneurship

**AGREEMENT OF PARTNERSHIP  
SAMRUDDHI TBI FOUNDATION  
AND  
PARTNERING INSTITUTE**

## 10. FORCE MAJEURE

Neither parties shall be held responsible for non-fulfillment of their respective obligations under this agreement due to the exigency of one or more of the force majeure events such as but not limited to, the acts of god, war, flood, earthquake, strikes, lockouts, epidemic, riots, civil commotions etc. provided on the occurrence and cessation of any such event the party affected thereby shall give a notice in writing to the other party within 30 (thirty) days of such occurrence or cessation. If the force majeure conditions continue beyond 6(six) months, the parties shall jointly decide about the future of action.






## 11. GOVERNING LAWS AND ARBITRATION

The parties agree that in the event there are any disputes or differences between them with regard to interpretation of this agreement. The parties shall endeavor to settle the matter through mutual negotiations and discussions in the spirit and understanding of the parties and failing such settlement, same shall be referred to arbitration by sole arbitrator mutually agreed between the parties and arbitration shall be in accordance with rules of "the arbitration and conciliation Act, 1996 and the rules framed there under from to time". The arbitrator shall be appointed by the director of STBI. The venue for arbitration proceedings shall be Sangli. The arbitration proceeding shall be conducted in English language. The expenses of arbitration shall be borne in accordance with the decision of arbitration with respect to thereto. Any arbitration award shall be final and binding, and judgment upon the award rendered pursuant to such arbitration may be entered in any court of proper jurisdiction.

## 12. SEAL OF THE PARTIES

In witness whereof the parties mentioned above, represented by their authorized representatives, set forth their hands on this the day, month and year and have caused this agreement to be signed in the presence of the following witness.

AGREED AND ACCEPTED ON THE DATE FIRST WRITTEN ABOVE

For and on behalf of STBI	For and on behalf of Institute
Signature:  Name: Jyoti I. Yadav Designation: Jyoti I. Yadav Executive Director Samruddhi TBI Foundation A-1, Samruddhi Park, Opp Vishrambag Railway Station, Sangli-Miraj Road, Sangli - 416415	Signature:  Name: Dr. B. M. Rathor Seal & Designation: <b>Ag. PRINCIPAL</b> Jaysingpur College, Jaysingpur
Witness ( Name & Signature) 1. Narendra Ambi 2. Nishikant Vaddikar 	Witness ( Name & Signature) 1. Mrs. Nakate S.R.  Spt-2017 2. Mrs. Chaugule S.S. 

STBI.....

INSTITUTE.....



Anekant Education Society's  
**JAYSINGPUR COLLEGE, JAYSINGPUR**

† Affiliated to Shivaji University, Kolhapur † Jain Minority College  
† Reaccredited at 'A' Grade (NAAC) † UST - FIST [Level - I] Sponsored

Address : Shirol-Wadi Road, Jaysingpur - 416 101, Dist. Kolhapur, State - Maharashtra, India

• Tel. (C) 02322 - 225381 / 481 • Website - www.jaysingpurcollege.edu.in • E-mail - jspcollege@gmail.com

Ref.No/AES/JCJ/By Hand

Date: 13/07/20

To,

Balaji Bakers  
A/p- Ichalkaranji  
Tal- Hatkanangale  
Dist- Kolhapur  
416 115

**Subject:** About internship permission for B.Sc. III Food Science & Quality Control students in your esteemed industry.

Respected Sir / Madam,

Jaysingpur College, Jaysingpur is a well reputed institute for Science, Arts, and Commerce and accredited by NAAC with 'A' grade. Institute is established in 1964 and run by Anekant Education society, Baramati.

With referencess to above mentioned subject we are sending our following listed B.Sc. III (Food Science & quality control) students from our college for internship programme as a part of co-curricular activities. This will help the studentsto understand the industrial proces as well as irt enhance their knowledge.

The student names is as follows,

S.N.	Name of Students	Mob. No.
1	Bhavana Kumar Kumbhar	9765300604

Jaysingpur College, Jaysingpur

Scanned By Scanner Go