SARVODAYA KELAVANI SAMAJ MANAGED,

SHREE MANIBHAI VIRANI & SMT. NAVALBEN VIRANI SCIENCE COLLEGE
AN AUTONOMOUS COLLEGE
(AFFILIATED TO SAURASHTRA UNIVERSITY)

Part III in Syllabus
of
UG Programmes

Skill Enhancement Courses (SEC) – II

Value Added Courses
(Total VAC = 20)

(For students admitted from **A.Y. 2016-17 & onwards**)

ANY SEMESTER BETWEEN II to V

Re-accredited at the 'A' Level (CGPA 3.28) by NAAC
'STAR' College Scheme & Status by MST-DBT
A College with Potential for Excellence - CPE (Phase-II) by UGC
Accredited at the G-AAA Highest Grade 'A-1′ Level by KCG, Govt. of Gujarat
UGC-DDU KAUSHAL Kendra
GPCB-Government of Gujarat approved Environment Audit Centre

Value Added Course

CONTENT

16UAEVA01	Surface Coating Techniques	40 Hrs	1 Credit

Unit 1: Surface coating **(03 Hrs)**

Introduction, objectives & applications of coating (on metal & non-metals), classification of surface coatings (inorganic & organic), preliminary treatment of surfaces.

Unit 2: Organic surface coating **(03 Hrs)**

Chemistry, composition, characteristics, role and applications of oil paints, water paints (emulsion paints), varnishes, lacquers and wax polishes.

Unit 3: Inorganic surface coating - Electroplating: **(03Hrs)**

Theory and electroplating techniques of copper, zinc, and chrome.

Unit 4: Inorganic surface coating - Non-electric coatings: **(03 Hrs)**

Theory, characteristics, special applications, and working techniques of hot dipping, metal spraying, vacuum metalizing, vitreous coating.

Unit 5: Additive Agents for Surface Coatings: **(03 Hrs)**

Introduction, role and classification of additives in surface coating processes. Additives - brighter, solvents, emulsifiers.

List of Proposed Practicals: **(25 Hrs)**

1. To prepare electrolyte and bath for Copper Electroplating.
2. To prepare electrolyte and bath for Zinc Electroplating.
3. To prepare electrolyte and bath for Chrome Electroplating.
4. To perform electroplating of Copper metal on given standard sample.
5. To perform electroplating of Zinc metal on given standard sample.
6. Demonstrative Practical: To perform electroplating of Chrome metal on given sample.
7. To perform analysis of electrolyte for Copper Electroplating.
8. To perform analysis of electrolyte for Zinc Electroplating.
9. To perform analysis of electrolyte for Chrome Electroplating.

Books Recommended:

1. Coatings materials and surface coatings - Arthur A. Tracton (Editor), CRC Press, Tailor &Fransis Group.
2. Engineering chemistry - R. Gopalan, D. Venkappayya, S. Nagarajan.
3. Chemistry in engineering and technology volume -1 & 2 – J.C. Kuriacose& J. Rajaram
4. Engineering chemistry – Jain & Jain

5. Industrial hygiene and chemical safety – M. K. Fulekar.

16UAEVA02	Formulation of Detergents & Toiletries	40 Hrs.	1 Credit

Unit.1 Surface active agents: **(03 Hrs)**

Introduction, classification, and role of surface active agents - emulsifiers, foaming agents, antifoaming agents, concept of HLB - HydrophileLipophile Balance.

Unit.2 Additive agents: **(03 Hrs)**

Introduction, types of additives, role of additives, selection of additives. Additives: colour, fragrance, preservatives, stabilizers, glycerine.

Unit.3 Soaps: **(03 Hrs)**

Introduction, composition, characteristics, role and applications of soaps, formulation process of soaps - both liquid and solid.

Unit.4 Detergents: **(03 Hrs)**

Introduction, composition, characteristics, role and applications of soaps, formulation process of detergents - both liquid and solid.

Unit.5 Toiletries: **(03 Hrs)**

Introduction, composition, characteristics, role and applications of toiletries like liquid dish-wash and domestic toilet cleaners. Formulation process of liquid dish-wash and domestic toilet cleaners.

List of Proposed Practical: **(25 Hrs.)**

1. Preparation of liquid hand-wash: Gel type - transparent.
2. Preparation of liquid hand-wash: Cream type - opaque.
3. Preparation of liquid dish-wash.
4. Preparation of domestic glass cleaner.
5. Preparation of domestic toilet cleaner.
6. Preparation of liquid detergent.
7. Preparation of tiles cleaner
8. Preparation of rust remover
9. Preparation of drainage cleaner
10. Preparation of shower gel & shampoo.

Books Recommended:

1. Surfactants and interfacial phenomena - Milton J. Rosen
2. Chemical formulation an overview of surfactant – based preparation used in everyday life – Tony Hargreave, Royal Society of Chemistry, 2003, ISBN: 0854046356
3. Cosmetic and Toiletry Formulations - Vol. 2, Ernest W. Flick, Noyes Publication

16UAEVA03	Soil & Water Analysis	40 Hrs.	1 Credit

Unit.1 Water Analysis – Physical examination: (03 Hrs)

pH, temperature, total dissolved solid, suspended solid, acidity, alkalinity, colour, taste, smell, turbidity, hardness of water.

Unit.2 Water Analysis – Nonmetallic inorganic constitutes (03 Hrs)

chloride, sulphate, sulphide, fluoride, phosphate, sulphur, nitrate, nitrite, carbon dioxide, ammonia, cyanide.

Unit.3 Water Analysis – Mineral and Toxic Ions (03 Hrs)

Mineral ions: calcium, magnesium, iron, sodium, silver, zinc, manganese. Toxic ions: lead, mercury, arsenic, beryllium, cadmium, chromium, copper, selenium.

Unit.4 Soil Analysis- Physical Test: (03 Hrs)

Soil Texture, Water Holding Capacity, Bulk Density, Hydraulic Conductivity

Unit.5 Soil Analysis- Chemical Test (03 Hrs)

pH, Electrical Conductivity (EC), Organic Carbon ,Free Lime, macronutrients N, P, K, micronutrients Cu, Zn, Mg etc.

List of Proposed Practical: (25 Hrs)

Soil analysis-Determination of:

1. Water holding capacity
2. Bulk density
3. Soil Reaction (pH)
4. Electrical Conductivity (EC)
5. Calcium Carbonate ($CaCO_3$) Free Lime
6. Nitrogen, Phosphorous, Potassium

Soil analysis-Determination of:

1. pH
2. Electrical Conductivity (EC)
3. Carbonates & Bicarbonates
4. Calcium & Magnesium - EDTA Titrimetric Method
5. Chloride
6. Sulphate on Spectrophotometer

Reference Books:

1. Instrumental Analysis, H H Willard, CBS Publishing Co.
2. Handbook of Water Analysis, Third Edition, Leo M.L. Nollet, Leen S. P. De Gelder, CRC Press, ISBN 9781439889640

16UAEVA04	E-learning tools	40 hrs	1 Credit

Objectives:

To enable students to

1. Understand the concept of internet
2. Understand the use of Google tools & Technology
3. Create a document , presentation with formatting by using online tools
4. Understand the working of internet ,DNS
5. Create an effective presentation and diagram using online and offline tools
6. Create Simple website

Unit 1: Introduction of Internet **(08 Hrs)**

- Introduction of Network
  - Computer Networks & Type of Computer Network
  - Remote Desktop Login
  - What is Internet? & Use of Internet?
- Applications of Internet
  - World wide web(web page, web site, web client, URL web server)
  - DNS and Web Hosting
  - Email and how email transfer works, Social media and E-commerce
  - Data transfer over Internet
- How to stay safe on internet?
- How to download and upload?
- IP addressing

Unit 2: Google Tools & Technology **(08 hrs)**

- Internet search and Content
  - Google Trends
  - Google alerts(news and search e-mail alerts)
  - Google Earth (3-D satellite Imagery),
  - Google Image Search
  - Google Labs (online services research and development)
  - Google Local, Google Play Store (Marketplace for digital content)
  - Google (Google gravity , Google Water , Google Sphere etc...)
- Tools and application
  - Google sites (To create your personal Homepage) , Google profile
  - Blogger
  - Gmail, Google Drive (Docs , Forms etc), Google Chrome(web browser)
  - Google Language tools
  - Google Code
  - Google Calendar , Google Reader , Google Voice
  - Google Checkout (Google wallet)
  - Google Class room

Unit 3: Office Made Easy and Other Utility tools & technique (08 hrs)

- Word processing tool in detail
- Spreadsheet
- Presentation tool
    - Online/Offline presentation tool to make effective presentation(powtoonetc)
    - Diagrammatic Tools (Online and offline)
- Different File Conversion Tools

Unit 4: Learning Management SystemTools (08 hrs)

- Moodle
- Coursera, edx, Udemy, Lynda, Udacity, Codeschool, Microsoft Virtual Academy etc
- Overview of Freelancing (Fiverretc)

Unit 5: Other E-Learning Resources and Tools (08 hrs)

- Online Certification sites
- Online tools
- CourseLab
- exelearning.org ,lamsfoundation.org
- NPTEL
- MIT Open Course Ware
- Learners TV

Reference Books

1. *R.K. Taxali ,* **Pc Software For Windows Made Simple,** McGRAW HILL

Web References

1. http://www.google.com
2. www.courselab.com
3. nptel.ac.in
4. https://ocw.mit.edu,https://www.edx.org
5. https://www.coursera.org, https://www.udemy.com, https://www.lynda.com/
6. www.learnerstv.com

Text Books :

1. Ahilan. B, Felix. N and Santhanam.R., 2008. Text book of Aquariculture.Daya Publishing House, New Delhi.

2. Jhingran V.G. fish and fisheries of India. Hindustan publication Corpn.(India) Delhi.

3. M.Srinivaswa Reedy and K.R.S. SambasivaRao. Text book of Aquaculture.Discovery publication House, New Delhi – 110002.

References :

1. Vincent Hargreaves , The Complete Book of the Freshwater Aquarium, Thunder Bay Press, CA, 2nd edition, 2007.

2. John E.Bardach, John H. Ryther and William O.Mc.Larney Aquaculture. New York : Wiley-Interscience.

16UAEVA05	Desktop Data Publishing	40 hrs	1 Credit

Objectives:

To enable the students to

1. Create composite images that demonstrate advanced selection and layering techniques
2. Use basic selection tools and edge refinement to isolate and edit parts of an image
3. Manipulate layers through ordering, positioning, scaling, rotation, and adjustments
4. Prepare images for Web and print output with appropriate sizing and resolution
5. Apply painted masks, selection-based masks, gradient masks, and blend modes to create sophisticated image effects
6. Set and modify typography using the full range of type tools, the Character panel, and the Paragraph panel.
7. Apply special effects to typography using masks, paths, and layer styles.

Unit -1 Introduction to Photoshop (08 hrs)

- About Adobe Photoshop
- Graphics Basics
- Exploring Menus & Panels
- Customizing Workspaces
- Different file formats
- Work area Using Rulers and Guides
- Introduction to Colour
- Image Manipulation & Painting tools

Unit -2 Working with Layers, Image Post Production (Image Processing) (08 hrs)

- **Working with Layers**
  - Color Management, Levels & Curves, Using Retouching tools, Spot Healing Brush, Clone Stamp, Pattern Stamp, Red Eye, Eraser, Blur, Sharpen, Smudge, Dodge, Burn, Sponge Blurring and Sharpening Images, Color Replacement Tool, The Free Transform command

- **Image Post Production (Image Processing)**
  - Getting started with Photoshop Filters
  - Liquify Command
  - Exploring filters
  - Blur, Distort, Noise, Pixelate
  - Render, Sharpen, Stylize, Smart Filters,Lens Correction

Unit – 3 Scripting (08 hrs)

- Action
  - Using the Action palette, Droplet
  - Recording, Playing, Editing Action

- Adobe ImageReady
    - The Image Ready Interface
    - Image Maps
    - Image Slicing

Unit – 4 CorelDraw Basics and Interface **(08 hrs)**

- Exploring the CorelDraw Screen
- File Management
- Moving Around and Viewing Drawings
- Customizing Options
- Setting File Backups
- Objects- Creation and Manipulation, Drawing and Shaping Objects

Unit – 5 Working With Special Effects **(08 hrs)**

- Drawing with the Artistic Media Tool
- Shaping an Object with an Envelope
- Working with Text
- Working with Paragraph
- Special Text Effects
- Using Symbols and Clipart
- Working with Bitmaps
- Advanced Features
- Special Page Layouts

Reference Books

1. *Andrew Faulkner, Conrad Chavez,* **Adobe Photoshop Classroom in a Book,** Adobe
2. *M.C. Sharma,* **Corel Draw: Graphics Suite,** BPB Publication

16UAEVA06	Mushroom Cultivation	40 hrs	1 Credit

Course Profile:

Once called "Food of the Gods", edible Mushrooms are still treated as a garnish or delicacy and can be considered as healthy food rich in crude fibre, protein, low fat, low calories, high content vitamins, and mineral. Mushrooms also possess multi-functional medicinal properties. Mushroom cultivation technology is environmental friendly as many organic waste and refuse can be used for this purpose. The potential of mushroom farming in generating new employment opportunities is another positive element emanating from mushroom farming ventures. The course aims at developing skills and making the students become self-reliable and employable besides giving them an edge to become entrepreneur. That is, when students pass out of the college with their degrees, they also are equipped with additional skills to meet the challenges in future.

Employment Opportunities:

a. Job Prospects:

1. Lab assistant in mushroom labs.
2. Mushroom marketer in a industry
3. Mushroom lab equipment operator in a lab.
4. Mushroom spawn producer in a lab.
5. Mushroom processor in a farm.

b. Entrepreneur:

1. Mushroom spawn produce
2. Mushroom grower (crop producer),
3. Mushroom marketer
4. Mushroom processor.

Duration of course:

The course shall be conducted in batches for 40 Hours as per the declared schedule as and when a batch is filled up. Students may opt to enrol anytime of their study from the II to V semesters.

AdmissionProcedure

Candidates for admission the course should be B.Sc or M.Sc. degree students of Shree M. & N. Virani Science College, Rajkot. Interested students shall apply for admission at the time of notification inthe prescribedform, and enroll with the co-ordinator of the course. The course will be conducted as soon a batch is filled up.

Examinations:

The course carries 2 credits and the students will be evaluated on the basis of their performance in skill development and learning through regular practicals, assignments, field trips, group projects and tests. The pattern of evaluation will be 100% internal.

Certificates will be issued by the Autonomous College to the candidates on successful completion of the Course.

Course Objectives:

The Course is designed:

- To enable the students to identify the edible and poisonousmushrooms.
- To provide hands-on training for the preparation of bed for mushroom cultivation andit's harvesting, pests and diseases control and post harvestingmanagement.
- To provide the students awareness about the marketing trends ofMushrooms.
- To help the students to learn a means of self-employment and incomegeneration.

Unit 1: Introduction (10 Hrs)

- Introduction: General History, edible mushrooms, mushrooms with medicinal importance and poisonousmushrooms.
- Common Indianmushrooms.
- Nutritional value, medicinal value andadvantages.
- Systematicposition,morphology,distribution,structureandlifecycleof*Agaricus*.

Unit 2: Basics of Mushroom Cultivation (10 Hrs)

- Fundamentals of cultivation system- small village unit & larger commercial unit.
- Principles of mushroom farm layout- location of building plot, design of farm, bulk chamber, composting platform, equipments& facilities , pasteurization room & growing rooms.
- Cultivation: Paddy straw mushroom – substrate, spawnmaking.
- Methods – bedmethod, polythene bag method, fieldcultivation.
- Oyster mushroom cultivation –Substrate, spawning, pre-treatment ofsubstrate.

Unit 3: Post Cultivation process (10 Hrs)

- Maintenance ofmushroom.
- Diseases- Common pests, disease prevention and controlmeasures.
- Processing - Blanching, steeping, sun drying, canning, pickling, freezedrying.
- Storage – short term and long termstorage.

Unit 4: Economics of Mushroom Cultivation (10 Hrs)

- Production level, economic return, Foreign exchange from Mushroom cultivatingcountries and internationaltrade.

Practical

1. Identification of Edible and poisonous mushrooms
2. Microscopic observations of mushrooms
3. Cultivation of mushrooms at laboratory level

Text Books

1. Harander Singh. 1991. Mushrooms- The Art of Cultivation- SterlingPublishers.
2. Kaul, T.N. (1997). Introduction to Mushroom Science (Systematics). Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi & Calcutta, India.
3. VijayaKhader (1998). Mushrooms for Livelihood. Kalyani Publishers, Ludhiana, India.

Reference books

1. Mushroom Production and Processing Technology, PathakYadavGour (2010) Published by Agrobios (India).
2. Singh, Reeti and Singh, V.C. (2005). Modern Mushroom Cultivation. Agrobios, India.
3. Suman, B.C. and Sharma, V.P. (2005). Mushroom Cultivation and Uses. Agrobios, India.

16UMBVA07	Vermicomposting	40 hrs	1 Credit

Objectives:

By completing this lesson, students will be able to:

1. Identify the concepts of vermicomposting
2. List several advantages of vermicomposting to recycle food waste
3. Indicate how vermicomposting is beneficial to plants and soils
4. Recall some ways earthworms have influenced history
5. Describe categories of earthworms

Unit 1: Introduction to Vermicomposting **(10 Hrs)**

- Definition,
- introduction and scope:
- Ecological classification:
- Humus feeders, Humus formers, leaf mold, top soil and sub soil types.

Unit 2: Mechanism of Earthworm activity **(10 Hrs)**

- Physical changes brought by earth worm in soil
- Chemical changes brought by earth worm in soil
- Biological changes brought by earth worm in soil
- Burrows - drilosphere - earthworm casts.

Unit 3: Conditions for Vermiculture **(10 Hrs)**

- Optimal conditions for Vermiculture
- Temperature
- Moisture
- pH
- Soil type, organic matter,
- Protection from sunlight, rain, predators
- Food preference.

Unit 4: Basic Components for vermiculture and Economics **(10 Hrs)**

- Culture practices - Home - School – Industries
- Vermi wash.
- Composting
- Required conditions
- Methods
- Advantages
- Cost-Benefit analysis of Vermicomposting.

Practical

1. Key to identification of different types of earthworms
2. Study of Systematic position, habits, habitat & External characters of *Eiseniafetida*
3. Study of Vermiculture, Vermiwash&Vermicompostequipments, devices
4. Preparation vermibeds, maintenance of vermicompost& climatic conditions.
5. Harvesting, packaging, transport and storage of Vermicompost and separation

Text Books

- Bhatt J.V. & S.R. Khambata (1959) "Role of Earthworms in Agriculture" Indian Council of Agricultural Research, New Delhi
- Dash, M.C., B.K. Senapati, P.C. Mishra (1980) " Verms and Vermicomposting" Proceedings of the National Seminar on Organic Waste Utilization and Vermicomposting Dec. 5-8, 1984, (Part B), School of Life Sciences, Sambalpur University, JyotiVihar, Orissa.
- Rahudakar V.B. (2004). GandulkhatashivayNaisargeekParyay, Atul Book Agency, Pune.

Reference books

- Jsmail, S.A., 1970, Vermicology. The biology of earthworms. Orient Longman, London.
- Lee, K.E., 1985. Earthworms - Their ecology and relationship with soil and land use, Academic Press, Sydney.
- Kevin, A and K.E.Lee (1989) " Earthworm for Gardeners and Fisherman" (CSIRO, Australia, Division of Soils)

16UAEVA08	WEALTH FROM WASTE	40 hrs	1 Credit

Objective:

To enable students to

1. Create sustainable orderliness, enhanced ecological balance, beauty, productivity, dignity in the society/nature
2. Explore market opportunities for the recovered and recycling materials
3. Experience developing a business model.

Unit 1: Waste Material: Collection and Treatment (06 hrs)

- Survey of available/generated waste
- Collection of waste materials**:** Husk leaves of corn, used ear of wheat, maize& other cereals
- Dyeing of waste material with natural colors
- Hardening of material: drying and ironing

Unit 2: Use of treated waste material: Flower preparation (10 hrs)

- Procedure of flower preparation
- Use of different materials
- Shapes and types of flowers

Unit 3: Flower arrangement for different purposes (10 hrs)

- Procedure for preparation of different flower
- Types and uses of different flower arrangements
- Small and large handy bouquet,table bouquet
- Photo frames, Flower vase, Wall Hangings
- Garlands and Ornaments

Unit 4: Marketing (08hrs)

- Need analysis, pricing and basic marketing strategies
- Preparation and designing of price list
- Methods of advertisement
- Exhibition cum sale
- Survey for the need of Product and its supply to the market

Unit 5: Project: Innovative Creation through Reuse and Recycling of Waste (06hrs)

16UAEVA09	FINANCIAL LITERACY & TAXATION	40 HRS	01 CREDIT

Objective:

To enable students to

1. Be familiar with financial products like equity, bonds, mutual funds and derivatives.
2. Decide selection of investment alternatives according to their investment needs and tax planning.

Unit 1: Basics of Banking, Investment & Portfolio Management (08 Hrs)

Types of Bank Accounts, Negotiable Instruments (cheque and draft), E-banking services, Debit cards and Credit Cards, Lending from Banks (Overdraft and loans).

Concept of Savings, Investment & Portfolio Management, Investment Alternatives (Fixed Deposits, PPF, Bonds – Debentures, Equity Shares, Derivatives, ETFs etc.), Features, Basics of risk and return.

Unit 2: Investing In Capital Market (Stock Market) (08 Hrs)

Introduction to Capital Market: Primary Market & Secondary Market. Equity Shares: Features, Trading in stock market, Screen Based Trading System, Dematerialisation (Demat), Types of Orders. Concept of Derivatives, Basics of Futures & Options, Investing in Derivatives.

Unit 3: Other Investment Alteratives (08 Hrs)

Concept of Mutual Fund, Benefits of Mutual Funds, Types of Mutual Funds. Concept of Bonds/Debentures, Types of Bonds, Investing in Bonds.

Unit 4:Insuring Resources (08 Hrs)

Concept of Insurance, Advantages of Insurance, Types of Insurance: Life, Health & Motor Vehicle.

Unit 5: Taxation (08 Hrs)

Basic Concepts of Taxation, Types of Tax: Direct & Indirect Taxes, Income tax slabs.

Text Books:

1. Kevin S,"*Security Analysis & Portfolio Management"*, PHI Learning Pvt. Ltd.
2. Pandian P, (Second Edition), "*Security Analysis & Portfolio Management"*, Vikas Publishing House.
3. ShahR. G.&Usha Devi, "*Income Tax (Direct Tax)"*, Himalaya Publications, 978-93-5262-164-4.

Reference Books:

1. Chandra P., "*Investment Analysis & Portfolio Management"*, Tata McGraw Hill.
2. SinghaniaV.K.&SinghaniaK.,*"Direct Taxes – Law & Practice"*, Taxmann.

16UAEVA10	Mechanical Operations	40 Hrs	1 Credit

Objective:

To enable students to

3. Understand properties of solid.
4. Carry out solid-solid separation.
5. Calculate power consumption in mechanical operations.

Unit 1: Particle Technology **(05 Hrs)**

Introduction to particle technology, solid processing operations, solid/liquid separation, Properties of solid, Characterisation of particle: particle shape, particle size, size distribution, mean particle size.

Unit 2: Fundamentals of Size Reduction **(06 Hrs)**

Objectives of size reduction, size reduction methods, Factors affecting size reduction process, Energy and power consumption in size reduction, Crushing efficiency, Laws of comminution, Size reduction equipment's and selection criteria for size reduction equipment,.

Unit 3: Size Reduction Equipments **(11 Hrs)**

Principle, Construction, Working, Advantages and Disadvantages of:

- Jaw Crusher
- Gyratory Crusher
- Roll Crusher
- Ball Mill
- Hammer Mill

Unit 4: Screen Analysis **(08 Hrs)**

Introduction to screens, Ideal screen, Actual Screen, Screen analysis, Construction and working of: Trommels, Vibrating Screens, Sieve Shaker.

Unit 5: Method of Separation of Solid on Specific Principles **(10 Hrs)**

Construction and working of:

- Gravity Settling Tank
- The Rake Classifier
- Riffled Tables
- Jigging and Hydraulic Jigging
- Magnetic Separtors

Text Books:

1. Gavhane K. A. (2009), "*Unit Operations-I"*, NiraliPrakashan, ISBN 978-81-90639-66-8.
2. Swain AK- Patra H- Roy GK (2011), "*Mechanical Operations*", Tata McGraw Hill Education Private Limited, ISBN(13):978-0-07-070022-2.

Reference Books:

3. Kiran D Patil (2009), "*Mechanical Operations: Fundamental Principles and Applications*", NiraliPrakashan, ISBN:978-93-80064-09-0.
4. McCabe, Smith and Harriot (2014), "*Unit Opertaions of Chemical Engineering*", McGraw Hill Education Publication, ISBN 0071247106, 9780071247108.

16UAEVA11	Vedic Mathematics	40Hrs	1 Credit

Objective:

To enable students to

1. Understand and appreciate the history of ancient mathematics methods
2. Understand the sixteen sutras of vedic mathematics
3. Utilize the sutras in order to solve related problems of short calculation.
4. Solve some of the algebraic problems using the vedic sutras.

Unit 1: Sutras 1 to 3 **(8Hrs)**

- EkadhikinaPurvena -By one more than the previous one (Cor: Anurupyena)
- NikhilamNavatashcaramamDashatah -All from 9 and the last from 10 (Cor: SisyateSesasamjnah)
- Urdhva-Tiryagbyham-Vertically and crosswise (Cor: Adyamadyenantyamantyena)

Unit 2: Sutras 4 to 6 **(8Hrs)**

- ParaavartyaYojayet-Transpose and adjust (Cor: KevalaihSaptakamGunyat)
- ShunyamSaamyasamuccaye-When the sum is the same, that sum is zero. (Cor: Vestanam)
- (Anurupye) Shunyamanyat-If one is in ratio, the other is zero (Cor: YavadunamTavadunam)

Unit 3: Sutras 7 to 9 **(8Hrs)**

- Sankalana-vyavakalanabhyam-By addition and by subtraction (Cor:YavadunamTavadunikrityaVargaYojayet)
- Puranapuranabyham-By the completion or non-completion (Cor: Antyayordashake)

Unit 4: Sutras 10 to12 **(8Hrs)**

- Chalana-Kalanabyham-Differences and Similarities (Cor: Antyayoreva)
- Yaavadunam-Whatever the extent of its deficiency (Cor: Samuccayagunitah)
- Vyashtisamanstih-Part and Whole (Cor: Lopanasthapanabhyam)

Unit 5: Sutras 13 to16 **(8Hrs)**

- ShesanyankenaCharamena-The remainders by the last digit (Cor: Vilokanam)
- Sopaantyadvayamantyam-The ultimate and twice the penultimate (Cor: GunitasamuccayahSamuccayagunitah)
- EkanyunenaPurvena-By one less than the previous one (Cor: Dhvajanka)
- Gunitasamuchyah-The product of the sum is equal to the sum of the product (Cor: Dwandwa Yoga)
- Gunakasamuchyah-The factors of the sum is equal to the sum of the factors

Text Books: -

1. Swami Bharati Krishna Tirtha, VasudevaSharanaAgrawala, V. S. Agrawala, MotilalBanarsidass Publishers Pvt Ltd., 1992
2. DhavalBathia, Vedic Mathematics Made Easy Jun 2005

Reference Books:-

1. VandanaSinghal, Vedic Mathematics for all ages: A beginner's Guide, MotilalBanarsidass Publishers Pvt Ltd.

16UAEVA12	Graphing-and-Plotting-Techniques	40 Hrs	1Credit

Objective:

To enable students to

1. Identify the relevant population, sample, study units (subjects) and variables.
2. Identify data that follow a normal curve and find chances and percentages using a normal curve.
3. Produce and interpret numerical summary statistics using mean, median, mode, range, standard deviation and variance.
4. Perform and interpret testing of hypothesis including chi-squared test and other ANOVA test for independence.

Unit 1: Types of data and functions **(8Hrs)**

- Basic plotting and charting concepts
- Functions including log, e^x, 2^x, a^x, sin, cos, tan and hyperbolic funct6ions
- Plotting of this functions
- Plotting experimental data

Unit 2: Plotting Data with Microsoft Excel **(7Hrs)**

- Defining a Data Series
- Pie Chart
- Column Chart
- Line Chart
- Bar Chart
- Area Chart
- Scatter Chart
- Other Chart Types

Unit 3: Plotting using SCILAB. **(8Hrs)**

- Scilab basics
- Matrices and vectors using Scilab
- Linespace command, colon operator
- Plot command and its parameters
- Polarplot command and it parameters.
- Formatting plots.

Unit 4: Plotting using GeoGebra **(7Hrs)**

- Basics of GeoGebra
- Plotting curves like circle, conics, lines, polygons etc using tool bar.
- Plotting using menu-bar of GeoGebra
- Formatting the figures in GeoGebra

Unit 5: Interpretation of data and its plots. **(6Hrs)**

- Observing the given data and plotting using any of the above methods
- Points to be observed as Interpretation of data from the given plot.
- Problems based on Interpretation.
- Identification of Relationship between variable like linear, quadratic, exponential, logarithmic and other.

Text Books: -

3. Judith Hohenwarter and Markus Hohenwarter, Introduction to GeoGebra
4. Micha□elBaudin, Introduction to Scilab
5. Vook , Microsoft Excel Charts and Graphs: The How-To Guide

Reference Books:-

1. Judith Hohenwarter and Markus Hohenwarter, The official manual of GeoGebra
2. Jean-Philippe Chancelier, Michel de Lara cermics, Introduction to Scilab, September 6, 2006

16UAEVA13	Food Adulteration	40 Hrs	1 Credit

Objective:

To enable students to

1. Be aware of adulteration of selected food products through various testing procedures
2. Understand the effects of adulterants in food
3. Create awareness of food adulteration to consumers.

Theory:

1. Introduction- definition,Types of adulteration and detection methods
2. Prevention of Food Adulteration Act.(PFA)
3. Types of Adulterants in spices
4. Types of Adulterants in milk and milk products
5. Types of Adulterants in flour, sugars, oils and food grains
6. Effect of Adulterants on Community Health

List of Practicals:

1. **To detect the presence of adulterants in sugar**
   1. Adulteration of chalk powder, washing soda in sugar
   2. Adulteration of various insoluble substances in sugar
2. **To detect the presence of adulterants in samples of chilli powder**
   1. Adulteration of red lead salts in chilli powder
   2. Adulteration of brick powder in red chilli powder
   3. Adulteration of Oil soluble coal tar colour in red chilli powder.
3. **To detect the presence of adulterants in samples of turmeric powder.**
   1. Adulteration of yellow lead salts to turmeric powder
   2. Adulteration of Chalk or yellow soap stone powder to turmeric powder
   3. Adulteration of Starch of maize, wheat, tapioca, rice to turmeric powder
4. **To detect the presence of adulterants in samples of Asafoetida(Hing).**
   1. Adulteration of Soap stone or other earthy matter in asafoetida
   2. Adulteration of chalk powder in asafoetida.
5. **To detect the presence of adulterants in samples of Coriander powder.**
   1. Adulteration of Dung powder in Coriander powder.
   2. Adulteration of Common salt in Coriander powder.
6. **To detect the presence of adulterants in samples of Milk.**
   1. Adulteration of starch powder in milk.
   2. Adulteration of formalin in milk.
   3. Adulteration of water in milk.
7. **To detect the presence of adulterants in samples of Milk.**
   1. Adulteration of paraffin wax and hydrocarbon in vegetable ghee
   2. Adulteration of argemone oil in edible oils
   3. Adulteration of dyes in fat
8. **To detect the presence of kesari dal in red gram dal.**
9. **To detect the presence of poppy seeds/argemone seeds in mustard.**

Reference Books:

1. Wiley, Harvey Washington Foods and Their Adulteration Rarebooksclub.com
2. Schlink, Frederick John Eat, Drink, and Be Wary: The Problems of Diet and Food Adulteration Literary Licensing, LLC
3. Bruce, E. M. (1917). Detection of the common food adulterants. D. Van Nostrand Company.
4. Hassall, A. H. (1876). Food: its Adulterations, and the Methods for their Detection. Longmans Green.

16UAEVA14	Instrument calibration & Maintenance	40 Hrs	1 Credit

Objectives:
To enable students to:

1. Become familiarised with different instruments like spectrophotometer, Audio Frequency oscillators, PH meter, PCR machine, Incubator. Conductivity meter, Polari meter etc.
2. Understand importance of calibration for measuring instruments.
3. Develop understanding among the students for the functioning and applications of the various instruments.

UNIT 1 : Spectrophotometer (05 Hrs)

- Introduction to spectrophotometer and types of spectrophotometer
- Calibration requirements, Types of Calibration
- Maintenance
- Spectrophotometer applications, Structure identification
- To study rate of reaction, Determination of dissociation constant

UNIT 2 : Audio Frequency Oscilltors (AFO) (05 Hrs)

- Introduction, Principle and working AFO
- Types of audio frequency oscillators, Calibration methods
- Specification of AFO, Frequency range, Control, Accuracy
- Distortion and noise level, Synchronization
- Applications of AFO

UNIT 3 : Incubator (05 Hrs)

- Introduction, Principle and working, Calibration methods
- Quality control and maintenance
- Applications, Growth and storage of bacterial cultures, Biochemical and haematological studies
- Pharmaceutical work and food analysis, Genetic engineering
- To create new organism, To make insulin and other essential biological proteins, to improve nutritional content of fruits.

UNIT 4 : PCR Machine (05 Hrs)

- Introduction, Construction and working
- Calibration methods, maintenance
- Sample Acquisition and Preparation
- Applications of PCR machine genetic testing, Prenatal testing
- Forensic applications, to understand genetic fingerprinting

UNIT 5 : PH Meter (05 Hrs)

- Introduction, construction and working
- Calibration and maintenance
- Types of PH meter
- Application of PH meter, Chemical laboratory work
- Soil measurement in agriculture, measurement of water quality for water supply system

UNIT 6 : Digital Potentio Meter **(05 Hrs)**

- Introduction, construction and working
- Calibration and maintenance
- Stability, Precision and accuracy in digital potentio meter
- Application of digital potentio meter, Chemical laboratory work
- Computer connectivity and software understanding

UNIT 7 : Digital Conductivity Meter **(05 Hrs)**

- Introduction, construction and working
- Calibration and maintenance
- Auto temperature in conductivity meter
- Application of digital conductivity meter, Chemical laboratory work
- Computer connectivity and software understanding

UNIT 8 : Digital Polari Meter **(05 Hrs)**

- Introduction, construction and working
- Calibration and maintenance
- Application of Polari meter, Chemical laboratory work
- Computer connectivity and software understanding

Reference Books:

1. J Michael Hollas, Modern Spectroscopy, Wiley publication.
2. John H Moore, Building Scientific instruments, Cambridge university press.
3. Degen, PCR applications manuals 3rd edition.
4. Stephen A Busin, A to Z of Quantitative PCR , Intl Univ line

16UAEVA15	Repair & Maintenance of House hold Appliances	40 Hrs	1 Credit

Objectives:

To enable students to:

1. Understand the necessity of good earthling in an electrical installation.
2. Familiarise with the safety precautions.
3. Acquire knowledge about principle of operation, working and application of variousdomestic appliances.
4. Acquire skills in house wiring
5. Acquire skills in assembly, repair, installation, of domesticappliances.

UNIT 1 : SAFTY PRACTICE AND MEASUREMNTS (10 Hrs)

- Safety practice - Lifting and handling loads, Heavy Equipments
- Fire extinguishers, Types of fire extinguishers
- General safety of tools and equipments, Electrical safety
- Purpose of Earthing, Types of Earthing
- Need of fuse, Types of fuses
- Basic electric shock guards, Roberts, MCBS

UNIT 2 : ELECTRIC MATERIALS, CABLES AND MEASUREMENTS (10 Hrs)

- Introduction to Electric Conductors
- Types of conductors, Insulators
- Measurements of electrical conductivity
- Measurement of line voltage, current, Electric power
- Direct current and testing the polarity,
- Alternating current and identifying phase, Neutral and earth terminals
- Types of electric cables, Crimping cable ends

UNIT 3 : DOMESTIC ELECTRICAL CONNECTIONS AND ELECTRIC MOTOERS WINDING (10 Hrs)

- Simple house wiring circuit
- Connecting number of lamps, Fans in series & parallel
- Different types of motors
- Preparation of winding table
- Connection diagram, Winding diagram for given Motor
- Testing the motor after rewinding

UNIT 4 : INSTALLATION, SERVICING AND REPARING OF ELECRICAL HOME APPLIENCE (10 Hrs)

- Understand home appliances like heater, Iron, Ceiling fan, Washing machine etc.
- Dismantle and reassemble Ceiling fan, Table fan, Water heater, Washing machines
- General repair of heating Iron, Ceiling fan, Table fan, Washing machine etc.
- Maintenance of electrical appliances
- Regular services and faults finding in different electrical appliances
- Practice one installation of common electrical accessories such as switch, holder, Plug on board

Reference Books:

1. KB Bhatia, Study of Electrical Appliances and Devices, Khanna Publishers.
2. K Nath, Electrical Appliances Repairer & Maintenance, Hind Pocket Books.
3. Garshon J Wheeler, How to repair Electrical appliances, D.B. Taraporewala and Sons Co.Pvt. Ltd.
4. M L Anwani and I M Anwani, Electric Motor Winding and repair, DhanapatRai and Sons.
5. S R Roy, Electrical Gadgets and their repair, Pitamber Book Depot.

16UAEVA16	Circuit Designing and Fabrication	40 Hrs	1 Credit

Objectives:

To enable students to:

1. Become aware about circuit types, tracing and fabrication of various circuits of rectifiers, regulators, filters, amplifiers etc.
2. Develop skill among the students for the designing and preparation of such circuits.
3. Understand use of soldering iron, printed circuit board (PCB) and bread board for the different circuits.

UNIT 1 : DESINGING AND FABRICATION OF RECTIFIERS (10 Hrs)

- Introduction to rectifiers
- Types of rectifiers
- Half wave rectifiers, Full wave rectifiers bridge rectifiers
- Designing of different circuits for rectifier fabrication
- Tracing of different rectifier circuits

UNIT 2 : DESINGING AND FABRICATION OF AMPLFIERS (10 Hrs)

- Introduction to amplifiers
- Types of amplifiers
- Single stage transistor amplifier, Multistage transistor amplifier
- Transistor power amplifier
- Designing of different amplifying circuits
- Fabrication and tracing of different amplifying circuits

UNIT 3 : DESINGING AND FABRICATION OF FILTERS (10 Hrs)

- Introduction to filters
- Types of filters
- RL filters, RC filters, LCR filters, Pie filters
- Designing of different filters circuits
- Fabrication and tracing of different fitters circuits

UNIT 4 : DESINGING AND FABRICATION OF VOLTAGE REGULATORS (10 Hrs)

- Introduction to voltage regulators
- Types of voltage regulators
- Zener diode voltage regulator, Transistor series voltage regulator
- Transistor shunt voltage regulator
- Designing of different voltage regulator circuits
- Fabrication and tracing of different voltage regulator circuits

Reference Books:

2. V K Mehta, Principles of Electronics, S Chand Publication.
3. John D Ryder,Electronic fundamentals and applications, Prentice Hall publication.

B L Theraja, Basic Electronics, S Chand publication.

16UAEVA17	Mobile and TV Repairing	40 Hrs	1 Credit

Objectives:
To enable students to:

1. Be aware about technical details of TV and Mobile.
2. Develop skill among the students for to identity basic faults in TV and mobile and repair it.
3. Understand use of different softwares for mobiles applications.

Unit 1: Mobile Hardware **(10 Hrs)**

- Introduction to basic parts of mobile
- Various component used in mobile phones
- Different types of ICS used in mobiles
- Working on SMD, BGA, ICs and the PCB, Jumping techniques
- Fault finding and troubleshooting through circuit diagram
- Rearing procedure for different hardware problems

Unit 2: Mobile Software **(10 Hrs)**

- Introduction to different types of mobile softwares
- Downloading and formatting of softwares
- Functioning of Bluetooth and infrared
- Encryption and decryption of data
- Flashing and unlocking, Hands on mobile different softwares

Unit 3: CRT (Cathode Ray Tube) TV **(10 Hrs)**

- Introduction to CRT TV, CRT TV Communication System
- Elements of TV communication system
- Introduction to PAL, NTSC, SECAM systems
- Colour picture tube-construction and working
- Different sections of CRT TV receiver
- Troubleshooting procedures of a CRT TV, Practical troubleshooting

Unit 4: LCD and LED TV **(10 Hrs)**

- Introduction to LCD and LED TV
- Working knowledge of LCD panel concepts
- Difference between LCD and LED TV panel
- The method and tools to isolate LCD TV problems
- LCD TV troubleshooting procedures and techniques
- Working knowledge of LED panel
- LED TV troubleshooting procedures and techniques

Reference Books :

1. Homer L Davidson, TV repair for beginners, McGraw Hill publication.
2. PanditSanjib, Advance mobile repairing, BPB publication.
3. Homer L Davidson, Servicing TV/VCR combo units, S Chand Publication.

16UAEVA18	Regional Medicinal plants and Herbal Remedies	40 hrs	1 Credit

Course Profile:

The botanical wisdom accumulated by indigenous people has provided humankind with herbal drugs used in human healthcare for thousands of years. Although ancient texts are ceremonies indicate plants were used as medicine from the dawn of history, antibiotics and vaccinations developed in first half of the 20th century led conventional medicine to shun plant material for chemically synthesized replacements. Concerns about modern medicine and changes in life style and research during the past 20 years, however, have led to increased interest in using plants and plant extracts as medicine. In this course, we will focus on a series of plants used in remedial medicines to treat diseases and improve health. Medicinal plants as remedy will be explored through class presentation and discussions, looking to the future of medicines form plants.

Unit 1: Ethno medicine (03 Hrs)

- Introduction of medicinal plants,
- History of traditional medicine.
- Scope and feature of Ethno medicinal plants

Unit 2: Traditional knowledge and utility (03 Hrs)

- Traditional knowledge and utility of some medicinal plants in Gujarat
- Tribal medicinal plants of Gujarat.
- Methods of disease diagnosis and treatment.

Unit 3: Medicinal plants and remedies – I (06 Hrs)

- Cardiovascular diseases and its remedy from medicinal plants.
- Respiratory diseases and its remedy form medicinal plants.
- Kidney stone - remedy form medicinal plants.

Unit 4: Medicinal plants and remedies – II (06 Hrs)

- Skin diseases and its remedy from medicinal plants.
- Asthma and Bronchitis and its remedy from medicinal plants.
- Urinogenital diseases and its remedy from medicinal plants.

Unit 5: Common Medicinal plants and remedies (04Hrs)

- Plants in day to day life.
- Nutritive and medicinal values of fruits and seeds.
- Nutritive and medicinal values of Vegetables.

List of Practicals: **(18Hrs)**

1. Field study for identification of Medicinal plants.
2. Identification and medicinal values of locally available medicinal plants for cardiovascular diseases.
3. Identification and medicinal values of locally available medicinal plants for Respiratory diseases.
4. Identification and medicinal values of locally available medicinal plants for Kidney stone..
5. Identification and medicinal values of locally available medicinal plants for Skin diseases and Asthma.
6. Identification and medicinal values of locally available medicinal plants for Urinogenital diseases.
7. Nutritive and medicinal values of fruits and seeds.
8. Nutritive and medicinal values of Vegetables.
9. To prepares powder drug of locally available medicinal plants.

References:

1. Ethno biology – R.K.Sinha&ShwetaSinha – 2001. Surabhe Publications – Jaipur.

2. Tribal medicine – D.C. Pal & S.K. Jain 1998, NayaPrakash, 206, BidhanSarani, Calcutta – 700 006.

Text Books:

1. Kumar, N.C. (1993). An Introduction to Medical botany and Pharmacognosy. Emkay Publications, New Delhi.

2. Rao, A.P. (1999). Herbs that Heal. Diamond Pocket Books (P) Ltd.,

16UAEVA19	Aquarium Management Theory	40 hrs	1 Credit

Course Objectives :

This course introduces the freshwater hobbyist to various aspects of successful aquaria management. Rather than being an entertainment guide, which extols the virtues of one or other approach to aquaria management, this course presents the basic principles, themes and steps needed to set-up and maintain a freshwater aquarium. The course provides the key skills needed to set up and operate the aquarium business.This course also fulfill the requirements in order to maintain fish health, quality water chemistry and nutritional requirements, aquarium plants and ornamental plants. The practical section of the course, taught to built new aquarium house, on how to keep fish and aquatic animals as pets. which fish can live together and those that just don't get along. You will also learn how to look after them including health care and managing water quality.

Unit 1: Aquarium Tank and setting **(04 Hrs)**

- Types of tank
- Tank selection
- Tank setting and position
- Aquascaping

Unit 2: Aquarium Fishes and plants. **(06 Hrs)**

- Characters of Aquarium fishes
- Community Aquarium fishes

Unit 3: Aquarium Plants **(06 Hrs)**

- Introduction to Aquarium plants
- Importance of Aquarium plants
- Types of Aquarium plants
- Arrangement of Aquarium plants.

Unit 4: Aquarium Equipments and fish food. **(06 Hrs)**

- Common Aquarium equipments
- Fish feed and nutrition.

Unit 5: Aquarium Fish Diseases. **(06 Hrs)**

- Common aquarium diseases.
- Types of aquarium diseases.
- Cause, symptoms and cure of aquarium diseases.

List of Practicals : **(16 Hrs)**

1. Study of different types of aquarium tanks.
2. Study to aquarium tank arrangement.
3. Aquarium tank setting.
4. Characteristics of Fish.
5. Study of common aquarium fishes.
6. Study of common aquarium plants.
7. Demonstration to fish feed.
8. Study of some aquarium diseases.

16UAEVA20	English for competitive Exams	40 Hrs	1 Credit

Objectives:

To enable students to:

1. Familiarize with English as an integral part of various competitive exams.
2. Improve their English language and grammar.

Unit 1: Basic English Grammar **(08 Hrs)**

- Articles
- Prepositions
- Direct & Indirect Narration
- Voices

Unit 2: Common Errors **(08 Hrs)**

- Spelling Errors
- Spotting Errors

Unit 3: Sentence Structure **(08 Hrs)**

- Sentence Completion
- Sentence Improvement
- Reordering word and sentences

Unit 4: Language Work **(08 Hrs)**

- Synonyms & Antonyms
- One-Word Substitution
- Idioms & Phrases

Unit 5: Reading Comprehension Practice **(08 Hrs)**

- Dissecting Unseen Passages
- Finding answer to the questions from passages

Reference books:

1. English grammar & Comprehension- Ramesh Publishing House, New Delhi.
2. Kiran's Common Errors in English- KiranPrakashan, Delhi.
3. Handbook of Superfast English- KiranPrakashan, Delhi.
4. Lucent's General English- Lucent Publication, Patna.

Evaluation norms for Value added course - 100% CIE

- Only remarks will be given at the end of the course
- A separate certificate on completion of each course will be issued by the CoE

100 % CIE components

S.N.	Component	Content	Duration if any	Marks	Sub total
1	Attendance	Min. 80 %	For full 40 hr course	10	10
2	Practical	At least 75 % of practical performance attendance		50	50
3	Assignment	Number depending on coordinator	--	20	20
4	Test	Full syllabus of the theory	1 hr	20	20
				Total	100

- All above are compulsory components
- In event of non-completion of course, the student has to re-do the course or opt for another one.

❖ Evaluation norms have been presented in General BoS meeting on 10/9/2016 and subsequently passed & approved by Academic council meeting 29/11/2016.

SARVODAYA KELAVANI SAMAJ MANAGED,

SHREE MANIBHAI VIRANI & SMT. NAVALBEN VIRANI SCIENCE COLLEGE
AN AUTONOMOUS COLLEGE (AFFILIATED
TO SAURASHTRA UNIVERSITY)

Part III in Syllabus
of
UG Programmes

Skill Enhancement Courses (SEC) – II

Value Added Courses
(Total VAC = 20)

(For students admitted from **A.Y. 2018-19 & onwards**)

ANY SEMESTER BETWEEN II to V

Re-accredited at the 'A' Level (CGPA 3.28) by NAAC
'STAR' College Scheme & Status by MST-DBT
A College with Potential for Excellence - CPE (Phase-II) by UGC Accredited at the G-AAA Highest Grade 'A-1′ Level by KCG, Govt. of Gujarat UGC-DDU KAUSHAL Kendra
GPCB-Government of Gujarat approved Environment Audit Centre

Value Added Course

CONTENT

19AEVA01	Surface Coating Techniques	40 Hrs	1 Credit

Unit 1: Surface coating **(03 Hrs)**

Introduction, objectives & applications of coating (on metal & non-metals), classification of surface coatings (inorganic & organic), preliminary treatment of surfaces.

Unit 2: Organic surface coating **(03 Hrs)**

Chemistry, composition, characteristics, role and applications of oil paints, water paints (emulsion paints), varnishes, lacquers and wax polishes.

Unit 3: Inorganic surface coating - Electroplating: **(03Hrs)**

Theory and electroplating techniques of copper, zinc, and chrome.

Unit 4: Inorganic surface coating - Non-electric coatings: **(03 Hrs)**

Theory, characteristics, special applications, and working techniques of hot dipping, metal spraying, vacuum metalizing, vitreous coating.

Unit 5: Additive Agents for Surface Coatings: **(03 Hrs)**

Introduction, role and classification of additives in surface coating processes. Additives - brighter, solvents, emulsifiers.

List of Proposed Practicals: **(25 Hrs)**

1. To prepare electrolyte and bath for Copper Electroplating.
2. To prepare electrolyte and bath for Zinc Electroplating.
3. To prepare electrolyte and bath for Chrome Electroplating.
4. To perform electroplating of Copper metal on given standard sample.
5. To perform electroplating of Zinc metal on given standard sample.
6. Demonstrative Practical: To perform electroplating of Chrome metal on given sample.
7. To perform analysis of electrolyte for Copper Electroplating.
8. To perform analysis of electrolyte for Zinc Electroplating.
9. To perform analysis of electrolyte for Chrome Electroplating.

Books Recommended:

1. Coatings materials and surface coatings - Arthur A. Tracton (Editor), CRC Press, Tailor &Fransis Group.
2. Engineering chemistry - R. Gopalan, D. Venkappayya, S. Nagarajan.
3. Chemistry in engineering and technology volume -1 & 2 – J.C. Kuriacose& J. Rajaram
4. Engineering chemistry – Jain & Jain

5. Industrial hygiene and chemical safety – M. K. Fulekar.

19AEVA02	Formulation of Detergents & Toiletries	40 Hrs.	1 Credit

Unit.1 Surface active agents: **(03 Hrs)**

Introduction, classification, and role of surface active agents - emulsifiers, foaming agents, antifoaming agents, concept of HLB - HydrophileLipophile Balance.

Unit.2 Additive agents: **(03 Hrs)**

Introduction, types of additives, role of additives, selection of additives. Additives: colour, fragrance, preservatives, stabilizers, glycerine.

Unit.3 Soaps: **(03 Hrs)**

Introduction, composition, characteristics, role and applications of soaps, formulation process of soaps - both liquid and solid.

Unit.4 Detergents: **(03 Hrs)**

Introduction, composition, characteristics, role and applications of soaps, formulation process of detergents - both liquid and solid.

Unit.5 Toiletries: **(03 Hrs)**

Introduction, composition, characteristics, role and applications of toiletries like liquid dish-wash and domestic toilet cleaners. Formulation process of liquid dish-wash and domestic toilet cleaners.

List of Proposed Practical: **(25 Hrs.)**

1. Preparation of liquid hand-wash: Gel type - transparent.
2. Preparation of liquid hand-wash: Cream type - opaque.
3. Preparation of liquid dish-wash.
4. Preparation of domestic glass cleaner.
5. Preparation of domestic toilet cleaner.
6. Preparation of liquid detergent.
7. Preparation of tiles cleaner
8. Preparation of rust remover
9. Preparation of drainage cleaner
10. Preparation of shower gel & shampoo.

Books Recommended:

1. Surfactants and interfacial phenomena - Milton J. Rosen
2. Chemical formulation an overview of surfactant – based preparation used in everyday life – Tony Hargreave, Royal Society of Chemistry, 2003, ISBN: 0854046356
3. Cosmetic and Toiletry Formulations - Vol. 2, Ernest W. Flick, Noyes Publication

19AEVA03	Soil & Water Analysis	40 Hrs.	1 Credit

Unit.1 Water Analysis – Physical examination: **(03 Hrs)**

pH, temperature, total dissolved solid, suspended solid, acidity, alkalinity, colour, taste, smell, turbidity, hardness of water.

Unit.2 Water Analysis – Nonmetallic inorganic constitutes **(03 Hrs)**

chloride, sulphate, sulphide, fluoride, phosphate, sulphur, nitrate, nitrite, carbon dioxide, ammonia, cyanide.

Unit.3 Water Analysis – Mineral and Toxic Ions **(03 Hrs)**

Mineral ions: calcium, magnesium, iron, sodium, silver, zinc, manganese. Toxic ions: lead, mercury, arsenic, beryllium, cadmium, chromium, copper, selenium.

Unit.4 Soil Analysis- Physical Test: **(03 Hrs)**

Soil Texture, Water Holding Capacity, Bulk Density, Hydraulic Conductivity

Unit.5 Soil Analysis- Chemical Test **(03 Hrs)**

pH, Electrical Conductivity (EC), Organic Carbon ,Free Lime, macronutrients N, P, K, micronutrients Cu, Zn, Mg etc.

List of Proposed Practical: **(25 Hrs)**

Soil analysis-Determination of:

1. Water holding capacity
2. Bulk density
3. Soil Reaction (pH)
4. Electrical Conductivity (EC)
5. Calcium Carbonate ($CaCO_3$) Free Lime
6. Nitrogen, Phosphorous, Potassium

Soil analysis-Determination of:

1. pH
2. Electrical Conductivity (EC)
3. Carbonates & Bicarbonates
4. Calcium & Magnesium - EDTA Titrimetric Method
5. Chloride
6. Sulphate on Spectrophotometer

Reference Books:

1. Instrumental Analysis, H H Willard, CBS Publishing Co.
2. Handbook of Water Analysis, Third Edition, Leo M.L. Nollet, Leen S. P. De Gelder, CRC Press, ISBN 9781439889640

19AEVA04	E-learning tools	40 hrs	1 Credit

Objectives:

To enable students to

1. Understand the concept of internet
2. Understand the use of Google tools & Technology
3. Create a document , presentation with formatting by using online tools
4. Understand the working of internet ,DNS
5. Create an effective presentation and diagram using online and offline tools
6. Create Simple website

Unit 1: Introduction of Internet **(08 Hrs)**

- Introduction of Network
  - Computer Networks & Type of Computer Network
  - Remote Desktop Login
  - What is Internet? & Use of Internet?
- Applications of Internet
  - World wide web(web page, web site, web client, URL web server)
  - DNS and Web Hosting
  - Email and how email transfer works, Social media and E-commerce
  - Data transfer over Internet
- How to stay safe on internet?
- How to download and upload?
- IP addressing

Unit 2: Google Tools & Technology **(08 hrs)**

- Internet search and Content
  - Google Trends
  - Google alerts(news and search e-mail alerts)
  - Google Earth (3-D satellite Imagery),
  - Google Image Search
  - Google Labs (online services research and development)
  - Google Local, Google Play Store (Marketplace for digital content)
  - Google (Google gravity , Google Water , Google Sphere etc...)
- Tools and application
  - Google sites (To create your personal Homepage) , Google profile
  - Blogger
  - Gmail, Google Drive (Docs , Forms etc), Google Chrome(web browser)
  - Google Language tools
  - Google Code
  - Google Calendar , Google Reader , Google Voice
  - Google Checkout (Google wallet)
  - Google Class room

Unit 3: Office Made Easy and Other Utility tools & technique (08 hrs)

- Word processing tool in detail
- Spreadsheet
- Presentation tool
    - Online/Offline presentation tool to make effective presentation(powtoonetc)
    - Diagrammatic Tools (Online and offline)
- Different File Conversion Tools

Unit 4: Learning Management SystemTools (08 hrs)

- Moodle
- Coursera, edx, Udemy, Lynda, Udacity, Codeschool, Microsoft Virtual Academy etc
- Overview of Freelancing (Fiverretc)

Unit 5: Other E-Learning Resources and Tools (08 hrs)

- Online Certification sites
- Online tools
- CourseLab
- exelearning.org ,lamsfoundation.org
- NPTEL
- MIT Open Course Ware
- Learners TV

Reference Books

1. *R.K. Taxali ,* **Pc Software For Windows Made Simple,** McGRAW HILL

Web References

1. http://www.google.com
2. www.courselab.com
3. nptel.ac.in
4. https://ocw.mit.edu,https://www.edx.org
5. https://www.coursera.org, https://www.udemy.com, https://www.lynda.com/
6. www.learnerstv.com

Text Books :

1. Ahilan. B, Felix. N and Santhanam.R., 2008. Text book of Aquariculture.Daya Publishing House, New Delhi.

2. Jhingran V.G. fish and fisheries of India. Hindustan publication Corpn.(India) Delhi.

3. M.Srinivaswa Reedy and K.R.S. SambasivaRao. Text book of Aquaculture.Discovery publication House, New Delhi – 110002.

References :

1. Vincent Hargreaves , The Complete Book of the Freshwater Aquarium, Thunder Bay Press, CA, 2nd edition, 2007.
2. John E.Bardach, John H. Ryther and William O.Mc.Larney Aquaculture. New York : Wiley-Interscience.

19AEVA05	Desktop Data Publishing	40 hrs	1 Credit

Objectives:

To enable the students to

1. Create composite images that demonstrate advanced selection and layering techniques
2. Use basic selection tools and edge refinement to isolate and edit parts of an image
3. Manipulate layers through ordering, positioning, scaling, rotation, and adjustments
4. Prepare images for Web and print output with appropriate sizing and resolution
5. Apply painted masks, selection-based masks, gradient masks, and blend modes to create sophisticated image effects
6. Set and modify typography using the full range of type tools, the Character panel, and the Paragraph panel.
7. Apply special effects to typography using masks, paths, and layer styles.

Unit -1 Introduction to Photoshop (08 hrs)

- About Adobe Photoshop
- Graphics Basics
- Exploring Menus & Panels
- Customizing Workspaces
- Different file formats
- Work area Using Rulers and Guides
- Introduction to Colour
- Image Manipulation & Painting tools

Unit -2 Working with Layers, Image Post Production (Image Processing) (08 hrs)

- **Working with Layers**
  - Color Management, Levels & Curves, Using Retouching tools, Spot Healing Brush, Clone Stamp, Pattern Stamp, Red Eye, Eraser, Blur, Sharpen, Smudge, Dodge, Burn, Sponge Blurring and Sharpening Images, Color Replacement Tool, The Free Transform command

- **Image Post Production (Image Processing)**
  - Getting started with Photoshop Filters
  - Liquify Command
  - Exploring filters
  - Blur, Distort, Noise, Pixelate
  - Render, Sharpen, Stylize, Smart Filters,Lens Correction

Unit – 3 Scripting (08 hrs)

- Action
  - Using the Action palette, Droplet
  - Recording, Playing, Editing Action

- Adobe ImageReady
    - The Image Ready Interface
    - Image Maps
    - Image Slicing

Unit – 4 CorelDraw Basics and Interface **(08 hrs)**

- Exploring the CorelDraw Screen
- File Management
- Moving Around and Viewing Drawings
- Customizing Options
- Setting File Backups
- Objects- Creation and Manipulation, Drawing and Shaping Objects

Unit – 5 Working With Special Effects **(08 hrs)**

- Drawing with the Artistic Media Tool
- Shaping an Object with an Envelope
- Working with Text
- Working with Paragraph
- Special Text Effects
- Using Symbols and Clipart
- Working with Bitmaps
- Advanced Features
- Special Page Layouts

Reference Books

1. *Andrew Faulkner, Conrad Chavez,* **Adobe Photoshop Classroom in a Book,** Adobe
2. *M.C. Sharma,* **Corel Draw: Graphics Suite,** BPB Publication

19AEVA06	Mushroom Cultivation	40 hrs	1 Credit

Course Profile:

Once called "Food of the Gods", edible Mushrooms are still treated as a garnish or delicacy and can be considered as healthy food rich in crude fibre, protein, low fat, low calories, high content vitamins, and mineral. Mushrooms also possess multi-functional medicinal properties. Mushroom cultivation technology is environmental friendly as many organic waste and refuse can be used for this purpose. The potential of mushroom farming in generating new employment opportunities is another positive element emanating from mushroom farming ventures. The course aims at developing skills and making the students become self-reliable and employable besides giving them an edge to become entrepreneur. That is, when students pass out of the college with their degrees, they also are equipped with additional skills to meet the challenges in future.

Employment Opportunities:

a. Job Prospects:

1. Lab assistant in mushroom labs.
2. Mushroom marketer in a industry
3. Mushroom lab equipment operator in a lab.
4. Mushroom spawn producer in a lab.
5. Mushroom processor in a farm.

b. Entrepreneur:

1. Mushroom spawn produce
2. Mushroom grower (crop producer),
3. Mushroom marketer
4. Mushroom processor.

Duration of course:

The course shall be conducted in batches for 40 Hours as per the declared schedule as and when a batch is filled up. Students may opt to enrol anytime of their study from the II to V semesters.

AdmissionProcedure

Candidates for admission the course should be B . S c o r M . S c . degree students of Shree M. & N. Virani Science College, Rajkot. Interested students shall apply for admission at the time of notification inthe prescribedform, and enroll with the co-ordinator of the course. The course will be conducted as soon a batch is filled up.

Examinations:

The course carries 2 credits and the students will be evaluated on the basis of their performance in skill development and learning through regular practicals, assignments, field trips, group projects and tests. The pattern of evaluation will be 100% internal.

Certificates will be issued by the Autonomous College to the candidates on successful completion of the Course.

Course Objectives:

The Course is designed:

- To enable the students to identify the edible and poisonousmushrooms.
- To provide hands-on training for the preparation of bed for mushroom cultivation andit's harvesting, pests and diseases control and post harvestingmanagement.
- To provide the students awareness about the marketing trends ofMushrooms.
- To help the students to learn a means of self-employment and incomegeneration.

Unit 1: Introduction (10 Hrs)

- Introduction: General History, edible mushrooms, mushrooms with medicinal importance and poisonousmushrooms.
- Common Indianmushrooms.
- Nutritional value, medicinal value andadvantages.
- Systematicposition,morphology,distribution,structureandlifecycleof*Agaricus*.

Unit 2: Basics of Mushroom Cultivation (10 Hrs)

- Fundamentals of cultivation system- small village unit & larger commercial unit.
- Principles of mushroom farm layout- location of building plot, design of farm, bulk chamber, composting platform, equipments& facilities , pasteurization room & growing rooms.
- Cultivation: Paddy straw mushroom – substrate, spawnmaking.
- Methods – bedmethod, polythene bag method, fieldcultivation.
- Oyster mushroom cultivation –Substrate, spawning, pre-treatment ofsubstrate.

Unit 3: Post Cultivation process (10 Hrs)

- Maintenance ofmushroom.
- Diseases- Common pests, disease prevention and controlmeasures.
- Processing - Blanching, steeping, sun drying, canning, pickling, freezedrying.
- Storage – short term and long termstorage.

Unit 4: Economics of Mushroom Cultivation (10 Hrs)

- Production level, economic return, Foreign exchange from Mushroom cultivatingcountries and internationaltrade.

Practical

1. Identification of Edible and poisonous mushrooms
2. Microscopic observations of mushrooms
3. Cultivation of mushrooms at laboratory level

Text Books

1. Harander Singh. 1991. Mushrooms- The Art of Cultivation- SterlingPublishers.
2. Kaul, T.N. (1997). Introduction to Mushroom Science (Systematics). Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi & Calcutta, India.
3. VijayaKhader (1998). Mushrooms for Livelihood. Kalyani Publishers, Ludhiana, India.

Reference books

1. Mushroom Production and Processing Technology, PathakYadavGour (2010) Published by Agrobios (India).
2. Singh, Reeti and Singh, V.C. (2005). Modern Mushroom Cultivation. Agrobios, India.
3. Suman, B.C. and Sharma, V.P. (2005). Mushroom Cultivation and Uses. Agrobios, India.

19MBVA07	Vermicomposting	40 hrs	1 Credit

Objectives:

By completing this lesson, students will be able to:

1. Identify the concepts of vermicomposting
2. List several advantages of vermicomposting to recycle food waste
3. Indicate how vermicomposting is beneficial to plants and soils
4. Recall some ways earthworms have influenced history
5. Describe categories of earthworms

Unit 1: Introduction to Vermicomposting **(10 Hrs)**

- Definition,
- introduction and scope:
- Ecological classification:
- Humus feeders, Humus formers, leaf mold, top soil and sub soil types.

Unit 2: Mechanism of Earthworm activity **(10 Hrs)**

- Physical changes brought by earth worm in soil
- Chemical changes brought by earth worm in soil
- Biological changes brought by earth worm in soil
- Burrows - drilosphere - earthworm casts.

Unit 3: Conditions for Vermiculture **(10 Hrs)**

- Optimal conditions for Vermiculture
- Temperature
- Moisture
- pH
- Soil type, organic matter,
- Protection from sunlight, rain, predators
- Food preference.

Unit 4: Basic Components for vermiculture and Economics **(10 Hrs)**

- Culture practices - Home - School – Industries
- Vermi wash.
- Composting
- Required conditions
- Methods
- Advantages
- Cost-Benefit analysis of Vermicomposting.

Practical

1. Key to identification of different types of earthworms
2. Study of Systematic position, habits, habitat & External characters of *Eiseniafetida*
3. Study of Vermiculture, Vermiwash&Vermicompostequipments, devices
4. Preparation vermibeds, maintenance of vermicompost& climatic conditions.
5. Harvesting, packaging, transport and storage of Vermicompost and separation

Text Books

- Bhatt J.V. & S.R. Khambata (1959) "Role of Earthworms in Agriculture" Indian Council of Agricultural Research, New Delhi
- Dash, M.C., B.K. Senapati, P.C. Mishra (1980) " Verms and Vermicomposting" Proceedings of the National Seminar on Organic Waste Utilization and Vermicomposting Dec. 5-8, 1984, (Part B), School of Life Sciences, Sambalpur University, JyotiVihar, Orissa.
- Rahudakar V.B. (2004). GandulkhatashivayNaisargeekParyay, Atul Book Agency, Pune.

Reference books

- Jsmail, S.A., 1970, Vermicology. The biology of earthworms. Orient Longman, London.
- Lee, K.E., 1985. Earthworms - Their ecology and relationship with soil and land use, Academic Press, Sydney.
- Kevin, A and K.E.Lee (1989) " Earthworm for Gardeners and Fisherman" (CSIRO, Australia, Division of Soils)

19AEVA08	WEALTH FROM WASTE	40 hrs	1 Credit

Objective:

To enable students to

1. Create sustainable orderliness, enhanced ecological balance, beauty, productivity, dignity in the society/nature
2. Explore market opportunities for the recovered and recycling materials
3. Experience developing a business model.

Unit 1: Waste Material: Collection and Treatment (06 hrs)

- Survey of available/generated waste
- Collection of waste materials**:** Husk leaves of corn, used ear of wheat, maize& other cereals
- Dyeing of waste material with natural colors
- Hardening of material: drying and ironing

Unit 2: Use of treated waste material: Flower preparation (10 hrs)

- Procedure of flower preparation
- Use of different materials
- Shapes and types of flowers

Unit 3: Flower arrangement for different purposes (10 hrs)

- Procedure for preparation of different flower
- Types and uses of different flower arrangements
- Small and large handy bouquet,table bouquet
- Photo frames, Flower vase, Wall Hangings
- Garlands and Ornaments

Unit 4: Marketing (08hrs)

- Need analysis, pricing and basic marketing strategies
- Preparation and designing of price list
- Methods of advertisement
- Exhibition cum sale
- Survey for the need of Product and its supply to the market

Unit 5: Project: Innovative Creation through Reuse and Recycling of Waste (06hrs)

19AEVA09	FINANCIAL LITERACY & TAXATION	40 HRS	01 CREDIT

Objective:

To enable students to

1. Be familiar with financial products like equity, bonds, mutual funds and derivatives.
2. Decide selection of investment alternatives according to their investment needs and tax planning.

Unit 1: Basics of Banking, Investment & Portfolio Management (08 Hrs)

Types of Bank Accounts, Negotiable Instruments (cheque and draft), E-banking services, Debit cards and Credit Cards, Lending from Banks (Overdraft and loans).

Concept of Savings, Investment & Portfolio Management, Investment Alternatives (Fixed Deposits, PPF, Bonds – Debentures, Equity Shares, Derivatives, ETFs etc.), Features, Basics of risk and return.

Unit 2: Investing In Capital Market (Stock Market) (08 Hrs)

Introduction to Capital Market: Primary Market & Secondary Market. Equity Shares: Features, Trading in stock market, Screen Based Trading System, Dematerialisation (Demat), Types of Orders. Concept of Derivatives, Basics of Futures & Options, Investing in Derivatives.

Unit 3: Other Investment Alteratives (08 Hrs)

Concept of Mutual Fund, Benefits of Mutual Funds, Types of Mutual Funds. Concept of Bonds/Debentures, Types of Bonds, Investing in Bonds.

Unit 4:Insuring Resources (08 Hrs)

Concept of Insurance, Advantages of Insurance, Types of Insurance: Life, Health & Motor Vehicle.

Unit 5: Taxation (08 Hrs)

Basic Concepts of Taxation, Types of Tax: Direct & Indirect Taxes, Income tax slabs.

Text Books:

1. Kevin S,"*Security Analysis & Portfolio Management"*, PHI Learning Pvt. Ltd.
2. Pandian P, (Second Edition), "*Security Analysis & Portfolio Management"*, Vikas Publishing House.
3. ShahR. G.&Usha Devi, "*Income Tax (Direct Tax)"*, Himalaya Publications, 978-93-5262-164-4.

Reference Books:

1. Chandra P., "*Investment Analysis & Portfolio Management"*, Tata McGraw Hill.
2. SinghaniaV.K.&SinghaniaK.,*"Direct Taxes – Law & Practice"*, Taxmann.

19AEVA10	Mechanical Operations	40 Hrs	1 Credit

Objective:

To enable students to

3. Understand properties of solid.
4. Carry out solid-solid separation.
5. Calculate power consumption in mechanical operations.

Unit 1: Particle Technology **(05 Hrs)**

Introduction to particle technology, solid processing operations, solid/liquid separation, Properties of solid, Characterisation of particle: particle shape, particle size, size distribution, mean particle size.

Unit 2: Fundamentals of Size Reduction **(06 Hrs)**

Objectives of size reduction, size reduction methods, Factors affecting size reduction process, Energy and power consumption in size reduction, Crushing efficiency, Laws of comminution, Size reduction equipment's and selection criteria for size reduction equipment,.

Unit 3: Size Reduction Equipments **(11 Hrs)**

Principle, Construction, Working, Advantages and Disadvantages of:

- Jaw Crusher
- Gyratory Crusher
- Roll Crusher
- Ball Mill
- Hammer Mill

Unit 4: Screen Analysis **(08 Hrs)**

Introduction to screens, Ideal screen, Actual Screen, Screen analysis, Construction and working of: Trommels, Vibrating Screens, Sieve Shaker.

Unit 5: Method of Separation of Solid on Specific Principles **(10 Hrs)**

Construction and working of:

- Gravity Settling Tank
- The Rake Classifier
- Riffled Tables
- Jigging and Hydraulic Jigging
- Magnetic Separtors

Text Books:

1. Gavhane K. A. (2009), "*Unit Operations-I"*, NiraliPrakashan, ISBN 978-81-90639-66-8.
2. Swain AK- Patra H- Roy GK (2011), "*Mechanical Operations*", Tata McGraw Hill Education Private Limited, ISBN(13):978-0-07-070022-2.

Reference Books:

3. Kiran D Patil (2009), "*Mechanical Operations: Fundamental Principles and Applications*", NiraliPrakashan, ISBN:978-93-80064-09-0.
4. McCabe, Smith and Harriot (2014), "*Unit Opertaions of Chemical Engineering*", McGraw Hill Education Publication, ISBN 0071247106, 9780071247108.

19AEVA11	Vedic Mathematics	40Hrs	1 Credit

Objective:

To enable students to

1. Understand and appreciate the history of ancient mathematics methods
2. Understand the sixteen sutras of vedic mathematics
3. Utilize the sutras in order to solve related problems of short calculation.
4. Solve some of the algebraic problems using the vedic sutras.

Unit 1: Sutras 1 to 3 **(8Hrs)**

- EkadhikinaPurvena -By one more than the previous one (Cor: Anurupyena)
- NikhilamNavatashcaramamDashatah -All from 9 and the last from 10 (Cor: SisyateSesasamjnah)
- Urdhva-Tiryagbyham-Vertically and crosswise (Cor: Adyamadyenantyamantyena)

Unit 2: Sutras 4 to 6 **(8Hrs)**

- ParaavartyaYojayet-Transpose and adjust (Cor: KevalaihSaptakamGunyat)
- ShunyamSaamyasamuccaye-When the sum is the same, that sum is zero. (Cor: Vestanam)
- (Anurupye) Shunyamanyat-If one is in ratio, the other is zero (Cor: YavadunamTavadunam)

Unit 3: Sutras 7 to 9 **(8Hrs)**

- Sankalana-vyavakalanabhyam-By addition and by subtraction (Cor:YavadunamTavadunikrityaVargaYojayet)
- Puranapuranabyham-By the completion or non-completion (Cor: Antyayordashake)

Unit 4: Sutras 10 to12 **(8Hrs)**

- Chalana-Kalanabyham-Differences and Similarities (Cor: Antyayoreva)
- Yaavadunam-Whatever the extent of its deficiency (Cor: Samuccayagunitah)
- Vyashtisamanstih-Part and Whole (Cor: Lopanasthapanabhyam)

Unit 5: Sutras 13 to16 **(8Hrs)**

- ShesanyankenaCharamena-The remainders by the last digit (Cor: Vilokanam)
- Sopaantyadvayamantyam-The ultimate and twice the penultimate (Cor: GunitasamuccayahSamuccayagunitah)
- EkanyunenaPurvena-By one less than the previous one (Cor: Dhvajanka)
- Gunitasamuchyah-The product of the sum is equal to the sum of the product (Cor: Dwandwa Yoga)
- Gunakasamuchyah-The factors of the sum is equal to the sum of the factors

Text Books: -

1. Swami Bharati Krishna Tirtha, VasudevaSharanaAgrawala, V. S. Agrawala, MotilalBanarsidass Publishers Pvt Ltd., 1992
2. DhavalBathia, Vedic Mathematics Made Easy Jun 2005

Reference Books:-

1. VandanaSinghal, Vedic Mathematics for all ages: A beginner's Guide, MotilalBanarsidass Publishers Pvt Ltd.

19AEVA12	Graphing-and-Plotting-Techniques	40 Hrs	1Credit

Objective:

To enable students to

1. Identify the relevant population, sample, study units (subjects) and variables.
2. Identify data that follow a normal curve and find chances and percentages using a normal curve.
3. Produce and interpret numerical summary statistics using mean, median, mode, range, standard deviation and variance.
4. Perform and interpret testing of hypothesis including chi-squared test and other ANOVA test for independence.

Unit 1: Types of data and functions **(8Hrs)**

- Basic plotting and charting concepts
- Functions including log, e^x, 2^x, a^x, sin, cos, tan and hyperbolic funct6ions
- Plotting of this functions
- Plotting experimental data

Unit 2: Plotting Data with Microsoft Excel **(7Hrs)**

- Defining a Data Series
- Pie Chart
- Column Chart
- Line Chart
- Bar Chart
- Area Chart
- Scatter Chart
- Other Chart Types

Unit 3: Plotting using SCILAB. **(8Hrs)**

- Scilab basics
- Matrices and vectors using Scilab
- Linespace command, colon operator
- Plot command and its parameters
- Polarplot command and it parameters.
- Formatting plots.

Unit 4: Plotting using GeoGebra **(7Hrs)**

- Basics of GeoGebra
- Plotting curves like circle, conics, lines, polygons etc using tool bar.
- Plotting using menu-bar of GeoGebra
- Formatting the figures in GeoGebra

Unit 5: Interpretation of data and its plots. **(6Hrs)**

- Observing the given data and plotting using any of the above methods
- Points to be observed as Interpretation of data from the given plot.
- Problems based on Interpretation.
- Identification of Relationship between variable like linear, quadratic, exponential, logarithmic and other.

Text Books: -

3. Judith Hohenwarter and Markus Hohenwarter, Introduction to GeoGebra
4. Micha• elBaudin, Introduction to Scilab
5. Vook , Microsoft Excel Charts and Graphs: The How-To Guide

Reference Books:-

1. Judith Hohenwarter and Markus Hohenwarter, The official manual of GeoGebra
2. Jean-Philippe Chancelier, Michel de Lara cermics, Introduction to Scilab, September 6, 2006

19AEVA13	Food Adulteration	40 Hrs	1 Credit

Objective:

To enable students to

1. Be aware of adulteration of selected food products through various testing procedures
2. Understand the effects of adulterants in food
3. Create awareness of food adulteration to consumers.

Theory:

1. Introduction- definition,Types of adulteration and detection methods
2. Prevention of Food Adulteration Act.(PFA)
3. Types of Adulterants in spices
4. Types of Adulterants in milk and milk products
5. Types of Adulterants in flour, sugars, oils and food grains
6. Effect of Adulterants on Community Health

List of Practicals:

1. **To detect the presence of adulterants in sugar**
   1. Adulteration of chalk powder, washing soda in sugar
   2. Adulteration of various insoluble substances in sugar
2. **To detect the presence of adulterants in samples of chilli powder**
   1. Adulteration of red lead salts in chilli powder
   2. Adulteration of brick powder in red chilli powder
   3. Adulteration of Oil soluble coal tar colour in red chilli powder.
3. **To detect the presence of adulterants in samples of turmeric powder.**
   1. Adulteration of yellow lead salts to turmeric powder
   2. Adulteration of Chalk or yellow soap stone powder to turmeric powder
   3. Adulteration of Starch of maize, wheat, tapioca, rice to turmeric powder
4. **To detect the presence of adulterants in samples of Asafoetida(Hing).**
   1. Adulteration of Soap stone or other earthy matter in asafoetida
   2. Adulteration of chalk powder in asafoetida.
5. **To detect the presence of adulterants in samples of Coriander powder.**
   1. Adulteration of Dung powder in Coriander powder.
   2. Adulteration of Common salt in Coriander powder.
6. **To detect the presence of adulterants in samples of Milk.**
   1. Adulteration of starch powder in milk.
   2. Adulteration of formalin in milk.
   3. Adulteration of water in milk.
7. **To detect the presence of adulterants in samples of Milk.**
   1. Adulteration of paraffin wax and hydrocarbon in vegetable ghee
   2. Adulteration of argemone oil in edible oils
   3. Adulteration of dyes in fat
8. **To detect the presence of kesari dal in red gram dal.**
9. **To detect the presence of poppy seeds/argemone seeds in mustard.**

Reference Books:

1. Wiley, Harvey Washington Foods and Their Adulteration Rarebooksclub.com
2. Schlink, Frederick John Eat, Drink, and Be Wary: The Problems of Diet and Food Adulteration Literary Licensing, LLC
3. Bruce, E. M. (1917). Detection of the common food adulterants. D. Van Nostrand Company.
4. Hassall, A. H. (1876). Food: its Adulterations, and the Methods for their Detection. Longmans Green.

19AEVA14	Instrument calibration & Maintenance	40 Hrs	1 Credit

Objectives:

To enable students to:

1. Become familiarised with different instruments like spectrophotometer, Audio Frequency oscillators, PH meter, PCR machine, Incubator. Conductivity meter, Polari meter etc.
2. Understand importance of calibration for measuring instruments.
3. Develop understanding among the students for the functioning and applications of the various instruments.

UNIT 1 : Spectrophotometer (05 Hrs)

- Introduction to spectrophotometer and types of spectrophotometer
- Calibration requirements, Types of Calibration
- Maintenance
- Spectrophotometer applications, Structure identification
- To study rate of reaction, Determination of dissociation constant

UNIT 2 : Audio Frequency Oscilltors (AFO) (05 Hrs)

- Introduction, Principle and working AFO
- Types of audio frequency oscillators, Calibration methods
- Specification of AFO, Frequency range, Control, Accuracy
- Distortion and noise level, Synchronization
- Applications of AFO

UNIT 3 : Incubator (05 Hrs)

- Introduction, Principle and working, Calibration methods
- Quality control and maintenance
- Applications, Growth and storage of bacterial cultures, Biochemical and haematological studies
- Pharmaceutical work and food analysis, Genetic engineering
- To create new organism, To make insulin and other essential biological proteins, to improve nutritional content of fruits.

UNIT 4 : PCR Machine (05 Hrs)

- Introduction, Construction and working
- Calibration methods, maintenance
- Sample Acquisition and Preparation
- Applications of PCR machine genetic testing, Prenatal testing
- Forensic applications, to understand genetic fingerprinting

UNIT 5 : PH Meter (05 Hrs)

- Introduction, construction and working
- Calibration and maintenance
- Types of PH meter
- Application of PH meter, Chemical laboratory work
- Soil measurement in agriculture, measurement of water quality for water supply system

UNIT 6 : Digital Potentio Meter **(05 Hrs)**

- Introduction, construction and working
- Calibration and maintenance
- Stability, Precision and accuracy in digital potentio meter
- Application of digital potentio meter, Chemical laboratory work
- Computer connectivity and software understanding

UNIT 7 : Digital Conductivity Meter **(05 Hrs)**

- Introduction, construction and working
- Calibration and maintenance
- Auto temperature in conductivity meter
- Application of digital conductivity meter, Chemical laboratory work
- Computer connectivity and software understanding

UNIT 8 : Digital Polari Meter **(05 Hrs)**

- Introduction, construction and working
- Calibration and maintenance
- Application of Polari meter, Chemical laboratory work
- Computer connectivity and software understanding

Reference Books:

1. J Michael Hollas, Modern Spectroscopy, Wiley publication.
2. John H Moore, Building Scientific instruments, Cambridge university press.
3. Degen, PCR applications manuals 3rd edition.
4. Stephen A Busin, A to Z of Quantitative PCR , Intl Univ line

19AEVA15	Repair & Maintenance of House hold Appliances	40 Hrs	1 Credit

Objectives:

To enable students to:

1. Understand the necessity of good earthling in an electrical installation.
2. Familiarise with the safety precautions.
3. Acquire knowledge about principle of operation, working and application of variousdomestic appliances.
4. Acquire skills in house wiring
5. Acquire skills in assembly, repair, installation, of domesticappliances.

UNIT 1 : SAFTY PRACTICE AND MEASUREMNTS (10 Hrs)

- Safety practice - Lifting and handling loads, Heavy Equipments
- Fire extinguishers, Types of fire extinguishers
- General safety of tools and equipments, Electrical safety
- Purpose of Earthing, Types of Earthing
- Need of fuse, Types of fuses
- Basic electric shock guards, Roberts, MCBS

UNIT 2 : ELECTRIC MATERIALS, CABLES AND MEASUREMENTS (10 Hrs)

- Introduction to Electric Conductors
- Types of conductors, Insulators
- Measurements of electrical conductivity
- Measurement of line voltage, current, Electric power
- Direct current and testing the polarity,
- Alternating current and identifying phase, Neutral and earth terminals
- Types of electric cables, Crimping cable ends

UNIT 3 : DOMESTIC ELECTRICAL CONNECTIONS AND ELECTRIC MOTOERS WINDING (10 Hrs)

- Simple house wiring circuit
- Connecting number of lamps, Fans in series & parallel
- Different types of motors
- Preparation of winding table
- Connection diagram, Winding diagram for given Motor
- Testing the motor after rewinding

UNIT 4 : INSTALLATION, SERVICING AND REPARING OF ELECRICAL HOME APPLIENCE (10 Hrs)

- Understand home appliances like heater, Iron, Ceiling fan, Washing machine etc.
- Dismantle and reassemble Ceiling fan, Table fan, Water heater, Washing machines
- General repair of heating Iron, Ceiling fan, Table fan, Washing machine etc.
- Maintenance of electrical appliances
- Regular services and faults finding in different electrical appliances
- Practice one installation of common electrical accessories such as switch, holder, Plug on board

Reference Books:

1. KB Bhatia, Study of Electrical Appliances and Devices, Khanna Publishers.
2. K Nath, Electrical Appliances Repairer & Maintenance, Hind Pocket Books.
3. Garshon J Wheeler, How to repair Electrical appliances, D.B. Taraporewala and Sons Co.Pvt. Ltd.
4. M L Anwani and I M Anwani, Electric Motor Winding and repair, DhanapatRai and Sons.
5. S R Roy, Electrical Gadgets and their repair, Pitamber Book Depot.

19AEVA16	Circuit Designing and Fabrication	40 Hrs	1 Credit

Objectives:

To enable students to:

1. Become aware about circuit types, tracing and fabrication of various circuits of rectifiers, regulators, filters, amplifiers etc.
2. Develop skill among the students for the designing and preparation of such circuits.
3. Understand use of soldering iron, printed circuit board (PCB) and bread board for the different circuits.

UNIT 1 : DESINGING AND FABRICATION OF RECTIFIERS (10 Hrs)

- Introduction to rectifiers
- Types of rectifiers
- Half wave rectifiers, Full wave rectifiers bridge rectifiers
- Designing of different circuits for rectifier fabrication
- Tracing of different rectifier circuits

UNIT 2 : DESINGING AND FABRICATION OF AMPLFIERS (10 Hrs)

- Introduction to amplifiers
- Types of amplifiers
- Single stage transistor amplifier, Multistage transistor amplifier
- Transistor power amplifier
- Designing of different amplifying circuits
- Fabrication and tracing of different amplifying circuits

UNIT 3 : DESINGING AND FABRICATION OF FILTERS (10 Hrs)

- Introduction to filters
- Types of filters
- RL filters, RC filters, LCR filters, Pie filters
- Designing of different filters circuits
- Fabrication and tracing of different fitters circuits

UNIT 4 : DESINGING AND FABRICATION OF VOLTAGE REGULATORS (10 Hrs)

- Introduction to voltage regulators
- Types of voltage regulators
- Zener diode voltage regulator, Transistor series voltage regulator
- Transistor shunt voltage regulator
- Designing of different voltage regulator circuits
- Fabrication and tracing of different voltage regulator circuits

Reference Books:

2. V K Mehta, Principles of Electronics, S Chand Publication.
3. John D Ryder,Electronic fundamentals and applications, Prentice Hall publication.

B L Theraja, Basic Electronics, S Chand publication.

19AEVA17	Mobile and TV Repairing	40 Hrs	1 Credit

Objectives:
To enable students to:

1. Be aware about technical details of TV and Mobile.
2. Develop skill among the students for to identity basic faults in TV and mobile and repair it.
3. Understand use of different softwares for mobiles applications.

Unit 1: Mobile Hardware **(10 Hrs)**

- Introduction to basic parts of mobile
- Various component used in mobile phones
- Different types of ICS used in mobiles
- Working on SMD, BGA, ICs and the PCB, Jumping techniques
- Fault finding and troubleshooting through circuit diagram
- Rearing procedure for different hardware problems

Unit 2: Mobile Software **(10 Hrs)**

- Introduction to different types of mobile softwares
- Downloading and formatting of softwares
- Functioning of Bluetooth and infrared
- Encryption and decryption of data
- Flashing and unlocking, Hands on mobile different softwares

Unit 3: CRT (Cathode Ray Tube) TV **(10 Hrs)**

- Introduction to CRT TV, CRT TV Communication System
- Elements of TV communication system
- Introduction to PAL, NTSC, SECAM systems
- Colour picture tube-construction and working
- Different sections of CRT TV receiver
- Troubleshooting procedures of a CRT TV, Practical troubleshooting

Unit 4: LCD and LED TV **(10 Hrs)**

- Introduction to LCD and LED TV
- Working knowledge of LCD panel concepts
- Difference between LCD and LED TV panel
- The method and tools to isolate LCD TV problems
- LCD TV troubleshooting procedures and techniques
- Working knowledge of LED panel
- LED TV troubleshooting procedures and techniques

Reference Books :

1. Homer L Davidson, TV repair for beginners, McGraw Hill publication.
2. PanditSanjib, Advance mobile repairing, BPB publication.
3. Homer L Davidson, Servicing TV/VCR combo units, S Chand Publication.

19AEVA18	Regional Medicinal plants and Herbal Remedies	40 hrs	1 Credit

Course Profile:

The botanical wisdom accumulated by indigenous people has provided humankind with herbal drugs used in human healthcare for thousands of years. Although ancient texts are ceremonies indicate plants were used as medicine from the dawn of history, antibiotics and vaccinations developed in first half of the 20th century led conventional medicine to shun plant material for chemically synthesized replacements. Concerns about modern medicine and changes in life style and research during the past 20 years, however, have led to increased interest in using plants and plant extracts as medicine. In this course, we will focus on a series of plants used in remedial medicines to treat diseases and improve health. Medicinal plants as remedy will be explored through class presentation and discussions, looking to the future of medicines form plants.

Unit 1: Ethno medicine (03 Hrs)

- Introduction of medicinal plants,
- History of traditional medicine.
- Scope and feature of Ethno medicinal plants

Unit 2: Traditional knowledge and utility (03 Hrs)

- Traditional knowledge and utility of some medicinal plants in Gujarat
- Tribal medicinal plants of Gujarat.
- Methods of disease diagnosis and treatment.

Unit 3: Medicinal plants and remedies – I (06 Hrs)

- Cardiovascular diseases and its remedy from medicinal plants.
- Respiratory diseases and its remedy form medicinal plants.
- Kidney stone - remedy form medicinal plants.

Unit 4: Medicinal plants and remedies – II (06 Hrs)

- Skin diseases and its remedy from medicinal plants.
- Asthma and Bronchitis and its remedy from medicinal plants.
- Urinogenital diseases and its remedy from medicinal plants.

Unit 5: Common Medicinal plants and remedies (04Hrs)

- Plants in day to day life.
- Nutritive and medicinal values of fruits and seeds.
- Nutritive and medicinal values of Vegetables.

List of Practicals: **(18Hrs)**

1. Field study for identification of Medicinal plants.
2. Identification and medicinal values of locally available medicinal plants for cardiovascular diseases.
3. Identification and medicinal values of locally available medicinal plants for Respiratory diseases.
4. Identification and medicinal values of locally available medicinal plants for Kidney stone..
5. Identification and medicinal values of locally available medicinal plants for Skin diseases and Asthma.
6. Identification and medicinal values of locally available medicinal plants for Urinogenital diseases.
7. Nutritive and medicinal values of fruits and seeds.
8. Nutritive and medicinal values of Vegetables.
9. To prepares powder drug of locally available medicinal plants.

References:

1. Ethno biology – R.K.Sinha&ShwetaSinha – 2001. Surabhe Publications – Jaipur.

2. Tribal medicine – D.C. Pal & S.K. Jain 1998, NayaPrakash, 206, BidhanSarani, Calcutta – 700 006.

Text Books:

1. Kumar, N.C. (1993). An Introduction to Medical botany and Pharmacognosy. Emkay Publications, New Delhi.

2. Rao, A.P. (1999). Herbs that Heal. Diamond Pocket Books (P) Ltd.,

19AEVA19	Aquarium Management Theory	40 hrs	1 Credit

Course Objectives :

This course introduces the freshwater hobbyist to various aspects of successful aquaria management. Rather than being an entertainment guide, which extols the virtues of one or other approach to aquaria management, this course presents the basic principles, themes and steps needed to set-up and maintain a freshwater aquarium. The course provides the key skills needed to set up and operate the aquarium business.This course also fulfill the requirements in order to maintain fish health, quality water chemistry and nutritional requirements, aquarium plants and ornamental plants. The practical section of the course, taught to built new aquarium house, on how to keep fish and aquatic animals as pets. which fish can live together and those that just don't get along. You will also learn how to look after them including health care and managing water quality.

Unit 1: Aquarium Tank and setting **(04 Hrs)**

- Types of tank
- Tank selection
- Tank setting and position
- Aquascaping

Unit 2: Aquarium Fishes and plants. **(06 Hrs)**

- Characters of Aquarium fishes
- Community Aquarium fishes

Unit 3: Aquarium Plants **(06 Hrs)**

- Introduction to Aquarium plants
- Importance of Aquarium plants
- Types of Aquarium plants
- Arrangement of Aquarium plants.

Unit 4: Aquarium Equipments and fish food. **(06 Hrs)**

- Common Aquarium equipments
- Fish feed and nutrition.

Unit 5: Aquarium Fish Diseases. **(06 Hrs)**

- Common aquarium diseases.
- Types of aquarium diseases.
- Cause, symptoms and cure of aquarium diseases.

List of Practicals : **(16 Hrs)**

1. Study of different types of aquarium tanks.
2. Study to aquarium tank arrangement.
3. Aquarium tank setting.
4. Characteristics of Fish.
5. Study of common aquarium fishes.
6. Study of common aquarium plants.
7. Demonstration to fish feed.
8. Study of some aquarium diseases.

19AEVA20	English for competitive Exams	40 Hrs	1 Credit

Objectives:

To enable students to:

1. Familiarize with English as an integral part of various competitive exams.
2. Improve their English language and grammar.

Unit 1: Basic English Grammar **(08 Hrs)**

- Articles
- Prepositions
- Direct & Indirect Narration
- Voices

Unit 2: Common Errors **(08 Hrs)**

- Spelling Errors
- Spotting Errors

Unit 3: Sentence Structure **(08 Hrs)**

- Sentence Completion
- Sentence Improvement
- Reordering word and sentences

Unit 4: Language Work **(08 Hrs)**

- Synonyms & Antonyms
- One-Word Substitution
- Idioms & Phrases

Unit 5: Reading Comprehension Practice **(08 Hrs)**

- Dissecting Unseen Passages
- Finding answer to the questions from passages

Reference books:

1. English grammar & Comprehension- Ramesh Publishing House, New Delhi.
2. Kiran's Common Errors in English- KiranPrakashan, Delhi.
3. Handbook of Superfast English- KiranPrakashan, Delhi.
4. Lucent's General English- Lucent Publication, Patna.

Evaluation norms for Value added course - 100% CIE

- Only remarks will be given at the end of the course
- A separate certificate on completion of each course will be issued by the CoE

100 % CIE components

S.N.	Component	Content	Duration if any	Marks	Sub total
1	Attendance	Min. 80 %	For full 40 hr course	10	10
2	Practical	At least 75 % of practical performance attendance		50	50
3	Assignment	Number depending on coordinator	--	20	20
4	Test	Full syllabus of the theory	1 hr	20	20
				Total	100

- All above are compulsory components
- In event of non-completion of course, the student has to re-do the course or opt for another one.

❖ Evaluation norms have been presented in General BoS meeting on 10/9/2016 and subsequently passed & approved by Academic council meeting 29/11/2016.

SARVODAYA KELAVANI SAMAJ MANAGED,

SHREE MANIBHAI VIRANI & SMT. NAVALBEN VIRANI SCIENCE COLLEGE

AN AUTONOMOUS COLLEGE

(AFFILIATED TO SAURASHTRA UNIVERSITY)

Re-accredited at the 'A' Level (CGPA 3.28) by NAAC
'STAR' College Scheme & Status by MST-DBT
A College with Potential for Excellence - CPE (Phase-II) by UGC
Accredited at the G-AAA Highest Grade 'A-1′ Level by KCG, Govt. of Gujarat
UGC-DDU KAUSHAL Kendra
GPCB-Government of Gujarat approved Environment Audit Centre
An Autonomous College by UGC

Part III in Syllabus
Of
UG Programmes
Skill Enhancement Courses (SEC) – II

Co-Curricular Courses
(Total CoC = 17)

(For students admitted from A.Y. 2016-17 and onwards)

ANY SEMESTER BETWEEN II to V

	Meeting Date& Enclosure/ Annexure Number	Details
A.Y. 2016-2017 And onwards	2nd AC, (29-11-16), Appendix W-CoC	Syllabus, Guidelines and Evaluation norms for 15 Co-Curricular Courses
	4th AC (17-7-18) Appendix K-(1)	Syllabus, Guidelines and Evaluation norms for 3 Co-Curricular Courses

List of Co-Curricular Courses

Sr No.	Department-Offering/ Coordinating	Course Code	Course Title	Course Hrs	Page No.
1	NSS	16UAECO01/16IAECO01	National Service Scheme - 4 Semesters	200	
2	NCC	16UAECO02/ 16IAECO02	National Cadet Corps – 4 Semesters	200	
3	Sports	16UAECO03/ 16IAECO03	Sports – 4 Semesters	200	
4	Chemistry	16UAECO04/ 16IAECO04	Quantitative Aptitude & Logical Reasoning for Government and Bank Competitive Exams	160	
5	Computer Sciences	16UAECO05/ 16IAECO05	Network Administration	80	
6	Computer Sciences	16UAECO06/ 16IAECO06	E-marketing	80	
7	Microbiology	16UAECO07/ 16IAECO07	Bio fertilizers	80	
8	Microbiology	16UAECO08/ 16IAECO08	Environmental Auditing & Monitoring	80	
9	Biotechnology	16UAECO09/ 16IAECO09	Plant Tissue Culture **(COP)**	140	
10	Biotechnology	16UAECO10/ 16IAECO10	Bioinformatics **(COP)**	140	
11	Biotechnology	16UAECO11/ 16IAECO11	Preparation for Competitive exams for Academic Vertical Mobility in Life Sciences	100	
12	Industrial Chemistry	16UAECO12/ 16IAECO12	Treatment of Environmental Waste	80	
13	Industrial Chemistry	16UAECO13/ 16IAECO13	Entrepreneurship Development	80	
14	Mathematics	16UAECO14/ 16IAEO14	Quantitative Aptitude & Logical Reasoning for Industrial Placement	160	
15	Biochemistry	16UAECO15/ 16IAECO15	Medical Laboratory Techniques **(COP)**	140	
16	English	16UAECO16/ 16IAECO16	General Awareness	80	
17	Library	16UAECO17/ 16IAEC017	Gandhian Studies	80	
18	Library	16IAEC018 / 16IAEC018	Woman Studies	80	

16UAECO01/ 16IAECO01	National Service Scheme	200 Hrs	01 Credit

Semesters I, II, III & IV

ELIGIBILITY

Any undergraduate student can opt for the course.

DURATION OF THE COURSE

The course shall extend over a period of two years comprising of four semesters with two semesters in one academic year. Each semester normally consists of 5-6 theory lectures and 3 regular and 2 Special activities and one special camp only in fourth semester.

STRUCTURE OF THE COURSE

The NSS course shall have a curriculum comprising theory and activities with a specified syllabus. The curriculum of course is a blend of theory topics and activities as regular and special. In addition one special camp is compulsory in the IV semester.

OBJECTIVES OF THE COURSE

1. To kindle the student's social consciousness
2. To offer opportunities
   - i) to work with and among people
   - ii) to develop awareness and knowledge of social realities
   - iii) to engage themselves in creative and constructive social work
   - iv) to gain skills in the exercise of leadership.
   - v) to enrich their personality

SCHEME OF INSTRUCTION AND EXAMINATIONS

Course code	Course	Total Hrs	Maximum Marks			Total credit
			CIE	CEE	Total	
16UAECO01	**NSS: Break up** ***First & Second Semester*** Theory Regular activities Special activities ***Third & Fourth Semester*** Theory Regular activities Special activities Special Camp	**40-50 Hrs** **Per semester** **(2 Years)**	**100**	**-**	**100**	**01 credit**

Semester –I

Theory Paper-1:

Introduction to NSS

1. NSS-History and Objectives & Aspects of NSS Programme
2. Emblem, flag, motto, song, symbol , badge etc.
3. Definition, profile of youth
4. Issues, challenges and opportunities for youth
5. Youth as an agent of social change
6. Concept of regular activities, special camping

Regular Activities :

1. Orientation Program-[NSS Song & various types of clapping]
2. 15th August-Independence Day celebration and Enrollment
3. Festival celebrations
4. Visit eg. mentally challenged children's school
5. Charity programme-[Before Diwali vacation]
6. 24th Sept.-NSS Day Celebrations

Special Activities :

1. Tree plantation
2. 6th August- Anti Atomic/Hiroshima Day
3. 2nd October-Gandhi Jayanti
4. 14th November-Children's Day
5. Notice Board activity for auspicious days –July to December-Date and its significance

Semester –II

Theory Paper-2:

Leadership & Youth Development

1. Meaning and types of leadership
2. Qualities of good leaders
3. Traits of leadership
4. Importance and role of youth leadership
5. National Youth Policy
6. Youth Development Programmes at national level, State level and Voluntary sector

Regular Activities

1. Visit to old age Home
2. New Year celebration
3. Charity Programme
4. 26th January-Republic day
5. Health Awareness

Special Activities

1. Presentation on Indian National leaders
2. HIV Awareness
3. Small skits on leadership
4. Notice Board activity for auspicious days –January to June- Date and its significance

Semester –III

Theory Paper-3:

Family, Community and Society

1. Individual as an entity
2. Individual as a member of a family
3. Individual as a member of a community and
4. Individual as a member of a society.
5. Role of individual to safeguard nature
6. Rights & Responsibilities as citizen of India

Regular Activities

1. 2nd October-Swatch Bharat initiative
2. 15th August –One item to be presented
3. Festival celebrations
4. Activity where Family is involved
5. Activity where Society is involved

Special Activities

1. 24th Sept. NSS Day celebration
2. Balanced Diet
3. Organization of HIV Awareness
4. Notice Board activity for auspicious days –January to June- Date and its significance

Semester –IV

Theory Paper-4:

General Health Awareness

1. Definition, needs and scope of health education
2. Healthy Lifestyles
3. First Aid
4. Programmes associated with safety
5. Yoga as a tool for healthy lifestyle
6. Safe drinking water, water borne diseases and sanitation

Regular Activities

1. Preparation of any item of safety importance
2. 26th January –One item to be presented
3. New Year Celebrations
4. Health Awareness
5. Yoga practice

Special Activities

1. Health Awareness
2. Flag Day Celebrations
3. Interaction with juniors
4. Notice Board activity for auspicious days –January to June- Date and its significance

Special Camp compulsory for all the NSS Cadets

GUIDELINES FOR THE COURSE

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme co-ordinator and the Principal will be allowed to compensate in the next year.
2. The evaluation shall comprise of Continuous Internal Evaluation (CIE) for activities and two tests in the two years, one at end of each year for Paper 1&2 and Paper 3 &4 respectively.
3. Participation is compulsory in special camp in fourth semester.
4. Degree will be awarded only after receiving of the certificate.
5. Additional award will be given on being selected for national level activities like RDC, YEP, NIC etc. and it will be considered equivalent to special activities for that semester.
6. In event of non-completion of course, the student has to re-do the course or opt for another one.

EVALUATION NORMS

Distribution of 100% CIE components:

S.No.	Component	Content	Marks	Sub Total
1.	**Attendance**	Min.80%	07	**07**
2.	**Activities***	Regular-12	24	**48**
		Special-8	24	
3.	**Compulsory**	Special Camp only in Sem. IV	10	**10**
4.	**Test-I**	Theory of First year	10 (Set for 20)	**30**
	CEE	Theory of Full Syllabus	20 (Set for 40)	
5.	**Special marks**	Participation at RDC-State level	03	**05**
		Participation at RDC-National level	04	
		Participation at NIC	04	
		Participation at YEP	05	
			TOTAL	**100**

***Sub components for each type of activity:**

S.No.	Component	Regular Activity	Special Activity	Special Camp
1.	Attendance	05	07	Compulsory
2.	Active Participation	05	08	10
3.	Responsibility	05	07	10
4.	Report writing	05	08	10
	(Total) Set for total	**(2) 20**	**(3) 30**	**(10)30**

- At the end of the course a separate certificate on completion of course will be issued by the CoE having only remarks as follows:

- **Remarks:**

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO02/ 16IAECO02	National Cadet Corps	200 Hrs	01 Credit

Semesters I, II, III & IV

ELIGIBILITY :

Any undergraduate student can opt for the course with following eligibility.

- Age should be 15 to 25 years.
- Candidate must be medically fit.

DURATION OF THE COURSE :

- The course shall extend over a period of two years comprising of four semesters with two semesters in one academic year. Each semester normally consists of 45 theory &practical lectures as regular institutional training and 5 Special activities.

STRUCTURE OF THE COURSE :

- The NCC course shall have a curriculum comprising theory and practical courses with a specified syllabus by DG NCC. The curriculum of course is a blend of theory courses and activities as regular institutional training and special activities. In addition one special camp is compulsory either in the semester 3 or 4.

ENROLLMENT :

- Candidate get enrolled on voluntary basis
- If no of candidate are found more than available vacancies there would be a selection.
- A certificate holder, instrument player, state and national level sports person would be given priority.

OBJECTIVES OF THE COURSE :

National cadet core is offered to college student under Ministry of defence to develop leadership qualities, to create a responsible and trained human resource and to provide an opportunity to the youth of the country to serve for the nation.

To enable the students to

1. Provide additional benefit to the NCC cadet of the college
2. Generate more interest and awareness about NCC to the students of the college
3. Generate Pool of Trained NCC Cadet to achieve aims of NCC prescribed by DG NCC
4. Give the touch of regimental way of living like army through ATC and special camp
5. Imbibe the confidence and will to work.

JOB OPPORTUNITY

- Reservation in IMA , OTA Chennai, Air force and Naval Academy
- Direct entry to appear the service selection board For armed forces.(exemption from UPSC CDS exam
- Additional marks awarded to the merit for higher studies
- Additional marks awarded in the interview/merit for any govt service.

SCHEME OF INSTRUCTION & EVALUATION

Course code	Course	Total Hrs	Maximum Marks			Total credit
			CIE	CEE	Total	
16UAECO02	**NCC: Break up** ***First & Second Semester*** Theory Social activities ***Third & Fourth Semester*** Theory Social activities Training Camp	**40-50 Hrs** **Per semester** **(2 Years)**	**100**	**-**	**100**	**01 credit**

Semester –I

Theory Paper-1

NCC Common Subject Level-I

1. The NCC
2. Foot Drill-1
3. Social Awareness & Community Development-1
4. Environment awareness and conservation-1
5. Health & Hygiene -1

NCC Special Subject Level-I

1. Armed Forces
2. Military History

Personality Development Level –I

1. Introduction to personality Development
2. Factors influencing /shaping personality :Physical ,social ,psychological & Philosophical
3. Self awareness-1
4. Self awareness-2
5. Self awareness-3
6. Change your Mind set

MANDATORY SOCIAL ACTIVITY :

1. 15 August: Independence Day
2. Cleanliness drive
3. NCC day

Semester –II

Theory Paper-2

NCC Common Subject Level –II

1. Foot Drill-2
2. Health & Hygiene -2
3. Weapon Training-1
4. Disaster Management -1
5. Obstacle Training-1
6. Adventure

NCC Special Subject Level –II

1. Map Reading-1
2. Field craft & Battle craft-1

Personality development Level –II

1. Time Management
2. Attitude- assertiveness and Negotiation
3. Stress Management Skills
4. Importance of group/team work
5. Interpersonal relation ship & communication
6. Conflict: Motive & Resolution

MANDATORY SOCIAL ACTIVITIES

1. 1 Dec: AIDS day
2. 7 Dec: Armed forces flag day
3. 26 January: Republic day

Semester –III

Theory Paper-3

NCC Common Subject level III

1. National Integration and Awareness
2. Drill with Arms
3. Ceremonial drill
4. Social Awareness & Community Development-2
5. Environment awareness and conservation-2
6. Obstacle Training-2

NCC Special Subject level III

1. Introduction to Infantry Weapons & Equipment-1
2. Communication-1

Leadership Level –I

1. Types of leader ship
2. Effects Of Leader ship With historical examples
3. Communication Skill-1
4. Communication Skill-2
5. Communication Skill-3
6. Problem solving Skills

MANDATORY SPECIAL ACTIVITY:

1. Environment awareness
2. 21 June: International day of yoga
3. Independence Day
4. Cleanliness Drive
5. NCC day

Semester –IV

Theory Paper-4

NCC Common Subject Level-IV

1. Drill with Arms -2
2. Ceremonial drill -2
3. Weapon Training-2
4. Disaster Management-2
5. Social Awareness & Community Development-3
6. Environment awareness and conservation-3
7. Obstacle Training-3

NCC Special Subject Level-IV

1. Map Reading-2
2. Field craft & Battle craft-2
3. Introduction to Infantry Weapons & Equipment-2
4. Communication-2

Leadership Level-II

1. Self confidence, courage and self conviction
2. Values/code of ethics
3. Sociability : Social skills etiquettes & mannerism
4. Critical and creative thinking
5. Body Language
6. Influencing skills
7. Interview skills

MANDATORY SPECIAL ACTIVITY:

1. 1 Dec: AIDS day
2. 7 Dec: Armed forces flag day
3. 26 January: Republic day
4. 8 march: international women's day

GUIDELINES FOR THE PROGRAMME

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of NCC Officer and the Principal will be allowed to compensate in the next year.
2. Degree will be awarded only after receiving of the certificate.
3. Additional award will be given on being selected for national level activities like RDC, TSC, National Games, YEP, NIC etc.
4. Institutional training theory Syllabus is as prescribed by DG NCC and training plan by DG NCC, New Delhi.
5. During Sem –I & II (1st Year Of Training) cadet need to be attend 30 parades (each parade is of 3 period of 40 minutes so, 90 periods including practical).
6. During Sem III or Sem IV (2nd Year Of Training)cadet need to be attend 17 parades (1 parade = 3 period of 40 minutes so, 105 periods including practical)&One Annual Training Camp is compulsory (being eligible for B Certi exam).
7. Mandatory special activities are compulsory during each semester as per syllabus.(Special case of absence considered only when the cadet found in severe medical problem during the activities).
8. Successful completion of one training year and one theory and practical exam in the month of February/March.
9. The evaluation shall comprise of Continuous Internal Evaluation (CIE) for regular institutional training 10 special activities in each year.
10. 80 % attendance will be minimum required for getting the certificate.
11. Participation is compulsory in special camp in second year.

Distribution of 100% CIE component :

S. No.	Component	Content	Marks	Sub total
1	**Attendance**	Regular Institutional Training Parade	10	**10**
2	**Social Activity**	Mandatory Special activity -15 Minimum 12	12	**12**
3	**Compulsory**	Training Camp only in Sem. III or IV **Special marks** Participation at RDC-State level Participation at RDC-National level Participation at NIC Participation at YEP	10 03	**13**
4	**Theory exam**	**Test-1** As prescribed in the DG NCC Syllabus first year (semester I&II) **Test-2** As prescribed in the DG NCC Syllabus Second year (semester III&IV)	10 10	**20**
5	**Practical exam**	**Test-1** at the end of 1st year Drill test-1 , Map Reading-1 **Test-2** at the end of 2nd year Drill -2 ,MR-2, WT, FC&BC, Leadership, Responsibility, Republic day camp & YEP, Thal sena camp	15 30	**45**
		Total	100	**100**

Sub components for each type of activity :

S.No.	Component	Special Activity	Special Camp
1.	Attendance	06	Compulsory
2.	Active Participation	06	05
3.	Responsibility	00	03
4.	Report writing	00	01
	(Total) Set for total	**12**	**10**

- At the end of the course a separate certificate on completion of course will be issued by the CoE having only remarks as follows:

Remarks :

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO03/ 16IAECO03	Sports	200 Hrs	01 Credit

Semesters I, II, III & IV

ELIGIBILITY: As per AIU rules for any undergraduate student of the college.

DURATION OF THE COURSE

- The course shall extend over a period of two years comprising of four semesters with two semesters in one academic year.

OBJECTIVES OF THE COURSE

- Buildup physical fitness
- Buildup sportsmen spirit
- Sports Awareness

JOB OPPORTUNITY

All bodies of competitive examinations give extra credit and marks.

SCHEME OF INSTRUCTION & EVALUATION

Course code	Course	Total Hrs	Maximum Marks			Total credit
			CIE	CEE	Total	
16UAECO03	**Break up** ***First Semester*** Theory Any Two Outdoor Games Any One Indoor Game ***Second Semester*** Theory Any Two Outdoor Games Any One Indoor Game ***Third Semester*** Theory Any Two Outdoor Games Any One Indoor Game ***Fourth Semester*** Theory Any Two Outdoor Games Any One Indoor Game	**40-50 Hrs** **Per semester** **(2 Years)**	**100**	**-**	**100**	**1 credit**

GAMES AND SPORTS:

OUTDOOR GAMES:	INDOOR GAMES:
1) Volley Ball	1) Badminton
2) Basket Ball	2) Chess
3) Hand Ball	3) Table Tennis
4) Hockey	4) Judo
5) Kho-Kho	5) Wrestling
6) Kabbadi	6) Yoga
7) Cricket	7) Rifle Shooting
8) Athletics	8) Lawn Tennis
9) Football	**9)** Swimming

Various sports and games (inter collegiate participation)

S. No.	Games	Result	Remarks
1	Swimming (boys and girls)	Champion	2 player selected in all india national
2	Chess (boys and girls)		Only participated
3	Kabbadi (boys)		Only participated
4	Badminton (boys and girls)		Only participated
5	Volley ball (boys)	Semi final	2 player selected in national
6	Handball (boys)	May be	Champion or runners up
7	Handball (girls)	May be	1 or 2 payer will select in national
8	Basketball (boys and girls)	May be	Will achieve good result
9	Football (boys)	May be	Will achieve good result
10	Hockey (boys)	May be	Champion or runners up
11	Softball (boys)	May be	Champion or runners up
12	Wait and power lifting (boys)	May be	Champion or runners up
13	Wrestling (boys and girls)	May be	Will achieve good result
14	Judo (boys and girls)	May be	Will achieve good result
15	Cricket (boys)	May be	Will achieve good result
16	Volley ball (girls)	May be	Will achieve good result
17	Loan tennis (boys and girls)	May be	Will achieve good result
18	Rifle shooting (boys and girls)	May be	Will achieve good result
19	Athletics (boys and girls)	May be	Will achieve good result
20	Yoga (boys and girls)	May be	Will achieve good result

Note: - If candidate enrolled in new game/team, it will be included.

Guidelines for the completion of the Course:

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms:

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments The pattern of evaluation with percentage weightage will be as specified below:

Distribution of 100% CIE components:

Sr. No.	Component	Content	Marks	Sub total
1	**Attendance**	Regularity in coaching-**08** Regularity in practice-**12**	**20**	**20**
2	**Practical Exam**	Ground measurement/marking any two out door and one indoor games **-10** Skill of game any two out door and one indoor games-**20**	**30**	**30**
3	**Theory Exam** 30 MCQ questions	Spots GK Ground measurement Games skills Nutrition ,Fitness, Yogasan	**30**	**30**
4	**Special Points**	Participate in inter collegiate tournaments **-05** Participate in adventure activities like tracking mountaineering-**05** Participate in inter university, national or international level-**10**	**20**	**20**
		Total	**100**	**100**

Remarks:

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO04/ 16IAECO04	Quantitative Aptitude & Logical Reasoning for Government & Bank Competitive Exams	160 Hrs	01 Credit

Objectives: To enable the students to

1. Create awareness among the youth of Saurashtra particularly from the deprived sections, about aims and objectives, procedures and relative advantages of various competitive examinations.
2. Inculcate in them the culture of serving the community and the nation.
3. Plan and conduct coaching and training programmes for successful participation in competitive examination.

SCHEME OF INSTRUCTION & EVALUATION

Course Code	Title	Total Hrs	Maximum marks			Credit
			CIE	CEE	Total	
16UAECO04	Quantitative Aptitude & Logical Reasoning for Government & Bank Competitive Exams	160	50	50	100	01

SYLLABUS

Unit.1 General Fundamentals of Mathematics for Competitive Exams : (15 Hrs)

Divisibility Test, Simplification, Division algorithm, unit digit in given number, cube root, cube, square root, square, relations of number, introduction to vedic mathematic techniques.

Unit.2 Arithmetic : (65 Hrs)

HCF & LCM, Average, Percentage, Ratio & Proportion, Profit Loss & Discount, Partnership & Mixture, Simple & Compound Interest, Time Work & Distance, Area, Volume

Unit.3 Algebra : (20 Hrs)

Permutation & Combination, Probability, Coordinate Geometry, Liner equation, Quadratic equation, Factorization, Polynomials

Unit.4 Trigonometry & Geometry : (25 Hrs)

A. Trigonometry: Trigonometric Ratio and Identities, Trigonometric Functions & their Properties, Height and Distance,

B. Geometry: Angels & sides related properties, Theorems of Geometry, Properties of triangles, Similarity & Congruence related Postulates

Unit.5 Reasoning : (35 Hrs)

A. Verbal Reasoning : Alphabet, Series, Analogy, Classification, Coding/Decoding, Blood relationship, Symbols & Notations, Distance & Direction, Ranking/ Arrangement, Input, Syllogism, Problem solving, Cause & Effect, Assumption, Conclusions/ Inferences, Courses of Action. Data sufficiency, Data Analysis and Miscellaneous
B. Non - Verbal Reasoning: Series, Analogy, Classification and Miscellaneous
Practical: Practice Session & Wkly Multiple objective test of 25 marks

Books Recommended:

1. Quantitative aptitude by Agrawal R. S. , Publishers: S. Chand & Co., New Delhi
2. Objective Arrithmatic by Rajesh Verma, Publishers: Arihant Publications (India) Ltd. , New Delhi
3. Quickwer Maths by M. Tyra, Publishers: BSC Publishing Co. Pvt. Ltd., Delhi
4. Analytical Reasoning by M K Pandey, Publishers: BSC Publishing Co. Pvt. Ltd., Delhi
5. Reasoning by Agrawal R. S , Publishers:Kiran Publication, New delhi.
6. Reasoning, Verbal, Non verbal & Analytical by B S Sijwali & Indu Sijwali Publishers: Arihant Publications (India) Ltd. , New Delhi

Guidelines for the completion of the Course:

6. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
7. Only remarks will be given at the end of the course.
8. A separate certificate on completion of each course will be issued by the CoE.
9. Degree will be awarded only after receiving of the certificate.
10. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms:
The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

Distribution of 100% CIE components:

S.N	Component	Content	Duration	Marks	Sub Total
1	Attendance	Theory: Min. 80%	For full 160 hrs course	10	10
		Practice Session & Weekly Multiple objective test: At least 75% of tests to be attended			
2	Unit Test	Total 5 unit tests (at the end of each unit)	1 Hr each	each 06 (set for 30)	30
3	Assignment	Number will be decided by coordinator (as per batch)	-	10	10
4	Course End Exam (CEE)	Full syllabus	3 Hrs	50	50
				Total	**100**

At the end of the course no marks are given, only remarks are given as follows:

Remarks:

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO05/ 16IAECO05	Network Administration	80 Hrs	01 Credit

Objectives: To enable the students to

1. Understand basic concepts of networking
2. Understand how network works
3. Understand requirements and importance of different transmission media
4. Understand role of different network devices
5. Install and configure server
6. Learn different network simulator tools
7. Learn to simulate and monitor network using tools
8. Learn to configure the basic server and DNS in detail with implementation

SCHEME OF INSTRUCTION & EVALUATION

Course Code	Title	Total Hrs	Maximum marks			Credit
			CIE	CEE	Total	
16UAECO05	Network Administration	80	60	40	100	01

SYLLABUS

Unit.1 Basics of network & Transmission media: (10 Hrs)

- Network concepts
  - What is network, Network model-Peer to peer, Client-server
- Network Services- File service, Print service, Communication service, Database service, Security service, Application service
- Network models and LAN sharing
  - OSI reference model
  - Disk quota, compression, mapping of network drive, File and print sharing
- Network Cable
  - Guided media
    - Co-axial cable, Twisted pair cable, Fibre optic cable
  - Unguided media
    - Infrared, laser, microwave, Bluetooth

Unit.2 Network Devices Switching concepts : (10 Hrs)

- Network devices

  LAN card, MODEM, DSL & ADSL, HUB (Active, passive and smart), Repeater, switch, bridge, router, Wireless switch, wireless router, access point

- Switching technology
  Circuit switching, Message switching, Packet switching

Unit.3 Network devices, Protocols and Simulators Tools : (20 Hrs)

- Protocols
  - HTTP, FTP, SMTP, POP3,TCP /IP,
- IP addressing
  - IPv4 with class structure
  - Migration from IPv4 to IPv6
- Network Monitoring Tools (Online/ Offline)
  - WireShark
  - OpenNMS
  - Zenoss Core etc
  - Monitor Network performance

Unit.4 Server Administration : (20 Hrs)

- Installation of Server
- Installation and configuration of Active Directory
  - Active Directory Installation & Configuration
  - Securing active directory domain services
  - Domains, Trees, Forests concept
  - Accounts(User, Group, Computer)
  - Policy (Security and audit)
  - Logging Events
  - Creating network drive
  - DNS & Installing DNS

Unit.5 Network Administration, Configuration & Troubleshooting : (20 Hrs)

- Network Simulation Tools details
- Network Simulation applications(Using Tool)
  - Basic router setup
  - Setting up router name and password
  - Basic switch setup
  - Switch configuration
  - Setting up telnet
  - Interfaces Configuration
  - VLAN & VTP setup

Reference Books :

1. *Glenn Berg,* 1998, **MCSE Networking Essential**, Glenn Berg Tech. Media
2. *Behrouz A. Forouzan*, 2006, **Data Communication and Networking (SIE),** McGraw-Hill
3. *Andrew S. Tanenbaum,* 2002, **Computer Networks** [Fourth Edition], Pearson Publication

Guidelines for the completion of the Course :

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms :

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

Distribution of 100% CIE components: Theory

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Two Assignments	-	-	10 each	20
b)	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
c)	Course End Exam	All 5 Units	02 Hrs	20 (set for 50)	20
				Grand Total	**50 Marks**

Distribution of 100% CIE components: Practical

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Two Assignments	-	-	10 each	20
b)	Test-I	50% of Experiments	02 Hrs	10 (set for 30)	10
c)	Course End Exam	All experiments	03 Hrs	20 (set for 50)	20
				Grand Total	**50 Marks**

Remarks :

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO06/ 16IAECO06	E-Marketing	80 Hrs	01 Credit

Objectives: To enable the students to

1. Work with a general model of online marketing and place online marketing tools, instruments and theories into a broader theoretical model/framework
2. Understand what the importance is of online marketing and social media to contemporary marketing
3. Learn how to use the internet as a research method and learn and practice on how to publish information on the internet themselves
4. Learn how to advertise in websites
5. Understand how to generate revenue from advertisement

SCHEME OF INSTRUCTION & EVALUATION

Course Code	Title	Total Hrs	Maximum marks			Credit
			CIE	CEE	Total	
16UAECO06	E-Marketing	80	60	40	100	01

SYLLABUS

Unit.1 Overview of E-Marketing : (10 Hrs)

- Introduction
- Objectives, Definition of e-marketing, features of e-marketing
- Scope and Benefits of e-marketing
- Problems in e-marketing
- E-marketing techniques
- Digital marketing and Internet Marketing

Unit.2 Building Websites using Wordpress & Social Media Marketing : (20 Hrs)

- Building websites for e-marketing
- Introduction & Installation of Wordpress
- Working with content
- Creating basic theme
- Creating Widgets and Plugins
- Introduction to Social Media
- Social Networking Platforms
- Blogging
- Microblogging using twitter

- Facebook Marketing
- Youtube Marketing

Unit.3 Search Engine Optimization : (10 Hrs)

- What is SEO
- what is search_marketting
- white hat SEO
- what is black SEO
- Browser Addon
- SEO project management
- Determining Top Competitors
- Benchmarking Current Indexing Status
- Benchmarking Current Rankings
- Benchmarking Current Traffic Sources and Volume
- Conduct SEO/Website SWOT Analysis
- The Theory Behind Keyword Research
- Traditional Approaches: Domain Expertise
- Site Content Analysis
- Keyword Research Tools
- Google Tag Manager in detail with tagging

Unit.4 Analytics Using Webmaster Tools : (20 Hrs)

- Webmaster Tools (Google, Bing)
- Google Adsense
    - Understanding Google Adsense,
    - Configuring your First Add,
    - Using Advance Add Placement Strategy,
    - Allowing and Blocking Ads, Using Performance Report,
    - Advanced Administration(Accessing Messages, Reviewing Payment Setting)

Unit .5 Other E-marketing Techniques : (20 Hrs)

- E-mail marketing
- Google Site(site.google)
- Google Adword
    - Introduction,
    - Exploring where ads show up
    - Understanding the structure
    - Creating an account,
    - Choosing between billing options, Starting Your First Campaign,
    - Customizing Your Campaign Settings

- Creating Your First Ad Group , Optimizing Your Ads, Working Offline with AdWords Editor

Reference Books :

1. *Lorrie Thomas*, 2011, **The McGraw-Hill 36-Hour Course: Online Marketing**, McGraw-Hill Education
2. *Stephanie Leary*, 2010, **Beginning WordPress 3**, Apress
3. *Dan Zarrella*, 2009, **The Social Media Marketing Book**, O'Reilly Media
4. *Eric Enge, Stephan Spencer, Rand Fishkin, Jessie C Stricchiola,* 2009 **, The Art of SEO : Mastering Search Engine Optimization,** O'Reilly Media
5. *Jerri L. Ledford*, 2009, **SEO: Search Engine Optimization Bible [2nd Edition],** Wiley India

Guidelines for the completion of the Course :

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms :

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

Distribution of 100% CIE components: Theory

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Two Assignments	-	-	10 each	20
b)	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
c)	Course End Exam	All 5 Units	02 Hrs	20 (set for 50)	20
				Grand Total	**50 Marks**

Distribution of 100% CIE components: Practical

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Two Assignments	-	-	10 each	20
b)	Test-I	50% of Experiments	02 Hrs	10 (set for 30)	10
c)	Course End Exam	All experiments	03 Hrs	20 (set for 50)	20
				Grand Total	**50 Marks**

Remarks :

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO07/ 16IAECO07	Biofertilizer	80 Hrs	01 Credit

Course Profile:

Constant use of land leads to loss of its fertility and thus the fertility needs to be replenished. The deficiency of any one or more nutrients in the soil may impair the growth and development of plants. Macro elements like nitrogen, phosphorous and potassium are required in larger quantities.CHEMICAL fertilizers like nitrogen, and phosphorous are applied to the land so that it regains its fertility. Materials of biological origin commonly used to maintain and improve soil fertility are called biofertilizers. These are categorized as Manures and Biofertilizers. Manures are organic wastes that after partial decay are added to the soil to increase crop productivity. Microorganisms that enrich the soil in nutrients by their biological activity are biofertilizers. Main sources are bacteria, cyanobacteria and fungi. Use of biofertilizers is one of the important components of integrated nutrient management, as they are cost effective and renewable source of plant nutrients to supplement the chemical fertilizers for sustainable agriculture.

Employment Opportunities:

a. Job Prospects:

1. As production in charge in Biofertilizer Producing Industry
2. In R&D Department of Biofertilizer Producing Industry
3. Agriculture Department of Government
4. National Institutes engaged in research on Biofertilizers

b. Entrepreneur:

1. Biofertilizer Production
2. Biofertilizer Marketing
3. Agro-consultant

Duration of course: The course shall extend over a period of Two Semester for 80 Hours. The course will normally commence in the month of August of every academic year.

Course Objectives: To enable the students to

1. Demonstrate the techno-economic viability of the biofertilizer to students.
2. Introduce rural based economically viable & self income generation production of biofertilizer.
3. Demonstrate the effectiveness of biofertilizer cultural practices in the farmers fields for enhanced crop productivity
4. Create self employment opportunities for students

SCHEME OF INSTRUCTION & EVALUATION

Course Code	Course	Total Hrs of Instructions	Exam Duration Hrs	Marks allotted			Credit
				CIE	CEE	Total	
16UAECO07	**Biofertilizers:** **1. Theory** **2. Practical**	30 Hrs-Theory 50 Hrs-Practical	01 Hr-Theory 02 Hrs-Practical	30 20	20 30	50 50	01
		80		**50**	**50**	**100**	**01**

SYLLABUS

Unit.1 Introduction : **(10 Hrs)**

- Definition of Biofertilizer and brief History
- General account of the microbes used as Biofertilizer for various crop plants
- Advantages of Biofertilizer over chemical fertilizers.
- Mechanism of ability of the organisms to work as Biofertilizer

Unit.2 N_2 Biofertilizer : **(15 Hrs)**

- Types and Characteristics
- Host-Rhizobium interaction
- N_2-fixation in root-nodules
- N_2-fixation in soil by free living microbes
- Production
- Methods of application

Unit.3 Azolla & BGA Bio fertilizers : **(10 Hrs)**

- Characteristics
- N2-fixation process
- Production
- Methods of application

Unit.4 Mycorrhizae & PSB Bio fertilizer (Phosphate solubilising Bacteria) : **(15 Hrs)**

- Importance and types of mycorrhizae inoculum in agriculture
- Isolation and mass production of AM and VAM , their mass production and field applications
- Isolation and Characterization of PSB
- Mechanism of phosphate solubilisation
- Production and Methods of application

Unit.5 Quality control of Bio fertilizers as per FCO (Fertilizer Control Order) : (15 Hrs)

- Introduction of FCO specifications for bio fertilizers
- Sampling procedure
- Method of analysis
- Standards of bio fertilizers
- Biostability, Storage, shelf life, quality control and marketing of product bio fertilizer
- Introduction to IP

Practical : **(15 Hrs)**

1 Isolation of Azotobacter from soil
2 Isolation of Azospirillum from soil.
3 Isolation of Rhizobium from root-nodules.
4 Isolation of Phosphate solubilising bacteria from soil.
5 Isolation of VAM fungi from soil. (Demonstration).
6 Determination of heterocyst frequency of blue-green bacteria.
7 Microbial limit test for PSB market fertilizer product.
8 Preparation of Biofertilizer at laboratory level and their pot testing
9 Prepare chart for fertilizer classification with chemical formula and nutrient content.
10 Estimate nutrient content (% N, %P2O, % K2O) in different fertilizers from their chemical formula.
11 Estimate percentage of Nitrogen in Ammonium chloride by substitution method.
12 Estimate percentage of Nitrogen in Ammonium sulfate by substitution method.
13 Estimate percentage of Nitrogen in Ammonium chloride by back titration
14 Estimate percentage of Nitrogen in Ammonium sulphate by back titration
15 Analysis of Urea by Formaldehyde method
16 Estimate percentage of Nitrogen in Ammonium Chloride/Sulphate by Kjeldhal's method
17 Estimate biuret content in Urea sample by colour comparison
18 Estimate percentage of Nitrogen in DAP by Formaldehyde method
19 Estimate percentage of Nitrogen in DAP by Kjeldhal's method
20 Prepare potassium sulphate
21 Prepare potasium chloride
22 Estimate ratio from Ammonia to Phosphoric acid in DAP
23 Prepare potassium nitrate

Text Books :

1. Purohit, S.S., P.R. Kothari and S.K. Mathur, 1993. Basic and Agricultural Biotechnology, Agro Botanical Pub. India.
2. Subba Rao, N. S. 1988. Biological nitrogen fixation: recent developments, Mohan Primlani for Oxford and IBH Pub. Co. (P) Ltd., India.
3. Somani, L.L., S.C. Bhandari, K.K. Vyas and S.N. Saxena. 1990. Biofertilizers, Scientific Publishers - Jodhpur.
4. Tilak, K.V.B. 1991. Bacterial Biofertilizers, ICAR Pub., New Delhi.

Reference books :

1. Bio fertilizers –Vyas & Vyas(Ekta Publication).
2. Bio fertilizers– Arun Sharma.
3. Practical Microbiology–R. C. Dubey and D. K. Maheshwari
4. Fertilizer Control Order–1985 amended up to June, 2011
5. Subba Rao, N.S., G.S. Venkataraman and S. Kannaiyan 1993. Biological nitrogen fixation, ICAR Pub., New Delhi.

Guidelines for the completion of the Course :

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms :

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

Distribution of 100% CIE components: Theory

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Two Assignments	-	-	10 each	20
b)	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
c)	Course End Exam	All 5 units	02 Hrs	20 (set for 50)	20
				Grand Total	**50 Marks**

Distribution of 100% CIE components: Practical

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Two Assignments	-	-	10 each	20
b)	Test-I	50% of Experiments	02 Hrs	10 (set for 30)	10
c)	Course End Exam	All experiments	03 Hrs	20 (set for 50)	20
				Grand Total	**50 Marks**

Remarks :

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO08/16IAECO08	Environmental Auditing and Monitoring (EAM)	80 Hrs	01 Credit

OBJECTIVES :

To enable the students to

1. Develop skills and knowledge for translating the theory and concepts of resource and environmental management into practice relevant to communities and workplaces today.
2. Apply monitoring and environmental management tools used by resource and environmental practitioners.
3. Consider the impacts of flows (energy, water, and resources/waste) within the built, urban, agricultural and natural environments.

SCHEME OF INSTRUCTION & EVALUATION

Semester –I & II							
Course Code	Course	Total Hrs- of Instructions	Exam Duration Hrs	Maximum Marks			Credit
				CIE	CEE	Total	
16UAECO08	**Environmental Auditing and Monitoring (EAM)** **1.Theory** 2. **Practical**	15 Hrs-Theory 25 Hrs-Practical (40 Hrs / Semester)	01 Hr-Theory 02 Hrs-Practical	30 30	20 20	50 50	01
		80		**50**	**50**	**100**	**01**

SYLLABUS

Paper-I: Introduction to Environmental and Natural resources-8 Hrs /wk

Unit.1 Multidisciplinary nature of environmental studies : (10 Hrs)

- Definition, scope and importance, need for public awareness.

- **Ecosystems :**
  - Concept of an ecosystem.
  - Structure and function of an ecosystem.
  - Producers, consumers and decomposers.
  - Energy flow in the ecosystem.
  - Ecological succession.
  - Food chains, food webs and ecological pyramids.

- Introduction, types, characteristic features, structure and function of the following ecosystems :-
  a. Forest ecosystem b. Grassland ecosystem
  c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit.2 Biodiversity and its conservation : (10 Hrs)

- Introduction – Definition : genetic, species and ecosystem diversity.
- Biogeographical classification of India
- Importance of biodiversity : Biodiversity at global, National and local levels.
- India as a mega-diversity nation • Hot-sports of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit.3 Social Issues and the Environment : (10 Hrs)

- From Unsustainable to Sustainable development
- Environmental ethics : Issues and possible solutions.
- Public awareness.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation.

Unit.4 Natural resources and associated problems : (10 Hrs)

- Introduction to Natural Resources,Types of Natural Resources, Role of an individual in conservation of natural resources.

a) Forest resources :

- Types of forest ecosystems and its importance, Forest Wealth in India
- Human impact on forest: Timber extraction, dams, mining and their effects on Forest and tribal people
- Use and over-exploitation, deforestation, case studies.

b) Water resources :

- Water distribution and Water bearing properties of rocks and soils,
- Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- Conservation of water

c) Energy & Mineral resources :

- Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources.
- environmental effects of extracting and using mineral resources, case studies.

d) Food resources :

- World food problems, changes caused by agriculture and over-grazing,
- effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Land resources :

- Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Paper-II : Fundamentals Of Environmental Auditing & Monitoring-8 Hrs /wk

Unit.1 Environmental Pollution : (10 Hrs)

- Definition, Cause, effects and control measures of :-
  a. Air pollution b. Water pollution
  c. Soil pollution d. Nuclear hazards
  e. Noise pollution f. Thermal pollution

- Solid waste Management : Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.
- Disaster management : floods, earthquake, cyclone and landslides.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.

Unit.2 Environment Audit : (10 Hrs)

- Definition of Environment Audit
- Importance of Environment auditing for industries.
- Types of audits, General audit methodology and basic structure of audit.
- Elements of an audit process and its importance. Concept of 1SO14000

Unit.3 Environmental Monitoring : (15 Hrs)

- **Air Quality Parameters**
- Relevant instruments/equipments and procedures (High Volume Sampler, Handy Sampler, Noise Meter, Spectrophotometer etc) TSPM, RSPM, SO_2, NOX, Stack Monitoring, Noise Level Measurements etc.

- **Water Quality Parameters**
- Water Quality Guidelines for Human Uses
- Relevant instruments/equipments and procedures (Flame Photometer, Water Testing Kits, Digital pH meter, BOD Incubator, Dissolved Oxygen Meter) Alkalinity, Ammonical Nitrogen, BOD, COD, DO, Coliform, Fluoride, Nitrate-Nitrogen, pH etc.

- **Soil Quality Parameters**
- Introduction to Soils and Sediments
- Relevant instruments/equipments and procedures (Soil Testing Parameters)
- pH, EC, Soil Moisture, Phosphate, Potassium, Sodium, etc.

List of Practicals: 02-03 Hrs/wk

1. **Water testing (According to BIS permisible limits) :**

1. Physical parameters*:*

1.1 To estimate the TS, TSS and TDS of given water samples
1.2 To check the turbidity of given water sample
1.3 To check the water temperature

2. Chemical parameters*:*

2.1 To check the pH content of water
2.2 To check the chloride content of given water sample
2.3 To check the total hardness of given water sample
2.4 To check the calcium content of water
2.5 Estimation of sulphate in given water sample
2.6 Estimation of nitrogen in given water sample
2.7 Estimation of phosphorus in given water sample
2.8 Estimation of residual free chlorine in given water sample
2.9 Estimation of DO in given water sample
2.10 Estimation of BOD in given water sample
2.11 Estimation of COD in given water sample

3. Microbial testing*:*

3.1 To check the total plate count in given water sample
3.2 MPN test

2. **Soil testing :**

1. Physical parameters:

1.1 To check the particle size of soil sample
1.2 To check the soil temparature
1.3 To check the pH of soil
1.4 To check the conductivity of soil
1.5 To check the moisture content of soil
1.6 To check the water holding capacity of soil
1.7 To determine the colour of soil

2. Chemical parameters:

2.1 To check the chloride content of soil
2.2 To check the organic content of soil
2.3 To check the nitrogen content of soil
2.4 To check the carbonate content of soil

3. **Air testing :**

1. Detection of particulate pollutants present in air
2. Detection of gaseous pollutants present in air

4. **Field Visit (Any One) :**

- Visit to a local area to document environment assets river/ forest/grassland/hill
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of simple ecosystems-pond, river, hill slopes, etc.

Guidelines for the completion of the Course :

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms :

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

Distribution of 100% CIE components: Theory

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Two Assignments	-	-	10 each	20
b)	Test-I	Any 2 Units	1.5 Hrs	10 (set for 30)	10
c)	Course End Exam	All 5 units	02 Hrs	20 (set for 50)	20
				Grand Total	**50 Marks**

Distribution of 100% CIE components: Practical

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Two Assignments	-	-	10 each	20
b)	Test-I	50% of Experiments	02 Hrs	10 (set for 30)	10
c)	Course End Exam	All experiments	03 Hrs	20 (set for 50)	20
				Grand Total	**50 Marks**

Remarks :

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO09/ 16IAECO09	Plant Tissue Culture (Career oriented Program)	Duration of Course & Semester 1Year (140 Hrs) Odd to Even	Students opting in Semester I & III	01 Credit

The career oriented programme in Plant Tissue Culture aims at training students in the area of Plant Biotechnology. This programme offers specialized curriculum in plant tissue culture. The student undergoing this programme would also be trained to assist plant tissue culture based industries in explaining and/or solving problems. In addition, the programme also aims at generating manpower capable of establishing their own industry or to serve in an industry or academic institution.

The above objectives assume significance in the light of the fact that vast Saurastra region of Gujarat, has no such programme at under graduate level to train and develop manpower in the ever-expending demand of plant tissue culture in India.

Eligibility and Duration of the Programme

Students enrolled in any undergraduate programme of this college, shall be eligible for admission. The Programme shall extend over a period of one academic year comprising of two semesters. The students of odd semester will be enrolled in the programme.

About the Course :

Plant tissue culture is a method or technique to isolate parts of plants (protoplasm, cells, tissues, and organs) and grow them on artificial media in aseptic conditions in a controlled space so that parts of these plants can grow and develop into complete plants. Plant tissue culture now has direct commercial applications as well as value in basic research. This course provides basic knowledge of plant tissue culture, about the organization, scope and profits of a tissue culture based industries and how to start with own industry *i.e.* entrepreneurships.
It is envisaged that professionally qualified graduates with a sound knowledge of their core disciplines and expertise in a concerned skill will have more openings in service, industry and self-employment sectors. Demand and scope for such professionally trained graduates are visible in the applied fields of almost all basic/core disciplines and faculties in the current changing global scenario and is likely to increase in the future.

Plant tissue culture is a method or technique to isolate parts of plants (protoplasm, cells, tissues, and organs) and grow them on artificial media in aseptic conditions in a controlled space so that parts of these plants can grow and develop into complete plants. Plant tissue culture now has direct commercial applications as well as value in basic research. This course provides basic knowledge of plant tissue culture, about the organization, scope and profits of a tissue culture based industries and how to start with own industry *i.e.* entrepreneurships.

Keeping these things in mind, curriculum is designed to attain the following learning goals which students shall accomplish by the time of end of this programme:

- This programme will facilitate students to attain knowledge on the brass tacks of plant tissue culture and will enable them to appreciate emerging and advanced concept in this area as well as it will help them to take their career in this field.

- The objective of the programme is to introduce career and market-oriented, skill enhancing add-on courses that have utility for job, self-employment and empowerment of the students.

- The Programme is planned to help the students to be the ground-breaking and multitalented personalities in the field of plant biotechnology and to provide the trained manpower required by Industry, Research and Development and Institutions of Higher Learning.

- Assist and identify potential enrollees, assist in identifying potential employers, assist with resumes and other job search skills.

SCHEME OF INSTRUCTION AND EXAMINATIONS

Course Code	Course	Hrs of Instruction / wk	Exam Duration (Hrs)	Max Marks			Credit
				CIE	CEE	Total	
Odd – Semester							
16UAECO09	**Core 1 Theory:** Basics of Plant Tissue culture	02	03	30	20	50	
	Core 1 Practical : Plant Tissue Culture Practical-1	04	03	20	30	50	
Total		**06**					**01**
Even – Semester							
16UAECO09	**Core 2 Theory:** Applied Plant Tissue Culture	02	03	30	20	50	
	Core 2 Practical : Plant Tissue Culture Practical-2	04	03	20	30	50	
Total		**06**				**200**	**01**

Odd - Semester

Core 1 Theory - Basics of Plant Tissue Culture (25 Hrs)

Objectives: To enable the students to

1. Understand the principle and applications of plant tissue culture
2. Define and describe components of plant tissue culture medium and methodology of preparation of medium
3. Independently establish in vitro culture of plant

Unit.1 Basic of Plant Tissue Culture – I : (05 Hrs)

- History, contribution of Indian Scientists.
- Concept of cellular totipotency and differentiation
- Scope and Applications of Plant Tissue Culture

Unit.2 Basic of Plant Tissue Culture - II : (05 Hrs)

- Laboratory Planning and Designing
- Plant tissue culture media: component and preparation
- role of nutrient in growth

Unit.3 Establishment of Cultures - I : (05 Hrs)

- Different stages of plant tissue culture
- Explant: types, collection and preparation
- Sterilization and aseptic inoculation of explants on suitable medium
-

Unit.4 Establishment of Cultures – II : (05 Hrs)

- Micropropagation pathways and criteria for selection of pathways
- Somatic embryogenesis
- Embryo culture and embryo rescue

Unit.5 Protoplast Culture : (04 Hrs)

- Isolation of protoplast: physical and enzymatic methods
- Culture of protoplast
- Special culture methods of protoplast

Core 1 Practical: Plant Tissue Culture Practical-1

Objectives: To enable the students to

- Understand the laboratory organization and requirement of plant tissue culture laboratory
- Learn to methodology of preparation and sterilization of stock solution and different tissue culture medium

- Independently establish the micropropagation protocol of important protocol

Laboratory Exercise : **(45 Hrs)**

1. Plant tissue culture: laboratory organization and facilities requirements
2. To study principles, methodology and handling of equipments used in plant tissue culture
3. Preparations of stock solutions for tissue culture medium preparation
4. Preparation of Plant tissue culture media (M S medium)
5. Preparation of other enriched medium for tissue culture (Nitsch and whites medium).
6. To study explant characteristics, preparation of explant and aseptic inoculation of explant
7. In vitro culture of suitable explant for induction of callus
8. Study of growth characteristics of callus
9. Establishment of cell suspension culture from callus
10. Study of growth in suspension culture using spectrophotometric/cell count method
11. In vitro establishment of shoot culture using mature node explant
12. Extraction and estimation of secondary metabolites from in vitro grown callus

Even - Semester

Core 2 Theory - Applied Plant Tissue Culture **(25 Hrs)**

Objectives: To enable the students to

1. Understand the principle and application of hybridization and develop skill to isolate, culture and fuse the plant protoplast
2. Define the causes, molecular mechanism & detection methods of variations arise during culture conditions
3. Understand the current scenario and scope of tissue culture based industries in India

Unit.1 Protoplast fusion and hybrids : **(05 Hrs)**

- Protoplast fusion: chemical and physical methods
- Selection method of true hybrid after fusion experiments
- Symmetric and Asymmetric hybrids and cybrids

Unit.2 Variability in Tissue Culture - I : **(05 Hrs)**

- Somaclonal variations
- Origin and causes of variation
- Molecular mechanism of variation

Unit.3 Variability in Tissue Culture – II : **(05 Hrs)**

- Scope of somaclonal variation in interspecific crosses
- Comparison of somaclonal variations and gametoclonal variations
- Methods to detect the variations

Unit.4 Hardening of tissue culture derived plantlets : (05 Hrs)

- Factors affecting hardening and acclimatization of tissue culture grown plants
- Primary and secondary hardening units; operation and managements
- Hardening and acclimatization – success and bottlenecks

Unit.5 Hardening of tissue culture derived plantlets : (05 Hrs)

- Scaling-up production and automation in plant propagation
- Global market of plant tissue culture
- Commercial opportunities in plant tissue culture with special reference to plant tissue culture industries in India

Core 2 Practical: Plant Tissue Culture Practical – 2

Objectives: To enable the students to

- Learn the technique to establish cultures of plant using mature internode & leaf explant
- Understand in vitro rooting techniques and methodology of hardening and acclimatization process of tissue culture grown plant
- Learn the techniques of isolation and culture of plant protoplast and methodology of artificial seed preparation

Laboratory Exercise : (45 Hrs)

1. In vitro establishment of shoot culture using mature internodes explant
2. In vitro establishment of shoot culture leaf explant
3. Root induction in *in vitro* raised shoots
4. To study the hardening and acclimatization of tissue culture raised plantlets
5. Culture of anther for production of androgenic haploids
6. Protoplast culture, isolation and regeneration
7. Meristem tip culture for production of virus free plants
8. Encapsulation of somatic embryos/shoot buds for production of synthetic seeds
9. Genomic DNA isolation of tissue culture raised micropropagules for molecular studies
10. To test the fidelity of tissue culture derived micropropagules using RAPD markers
11. To study the application of software (e.g. NTsys) for interpretation of data received from PCR amplification of tissue culture derived plants DNA for fidelity/diversity analysis

Reference Books :

1. Chawla, H.S. (2002). Introduction to Plant Biotechnology. Oxford & IBH Publishers.
2. Narayanaswamy, S. (1994). Plant cell and tissue culture. Tata McGraw-Hill Education.
3. Bhojwani, S. S., & Razdan, M. K. (1986). Plant tissue culture: Theory and practice (Vol. 5). Elsevier.
4. Gamborg, O. L., & Phillips, G. (Eds.). (2013). Plant cell, tissue and organ culture: fundamental methods. Springer Science & Business Media.
5. George, E. F., Hall, M. A., & De Klerk, G. J. (Eds.). (2007). Plant propagation by tissue culture: volume 1. The background (Vol. 1). Springer Science & Business Media.
6. Smith, R. (2012). Plant tissue culture: Techniques and Experiments. Elsevier Science.

Guidelines for the completion of the Course :

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms :

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

Distribution of 100% CIE components: Theory

Sr. No.	Component	Content	Duration	Marks	Sub Total
a)	Assignment-I Assignment-II	- -	- -	10 10	20
b)	Test-I	Any two units	02 Hrs	10 (set for 50)	10
c)	Course End Exam	All 5 units	02 Hrs	20 (set for 50)	20
				Grand Total	**50 Marks**

Distribution of 100% CIE components: Practical

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Observation book & record	-	-	10	10
b)	Test-I	50% of experiments	03Hrs	10 (set for 30 marks)	10
c)	Course End Exam	All experiments	04 Hrs	30 (set for 60 marks)	30
				Grand Total	**50**

Remarks :

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO10/ 16IAECO10	Bioinformatics (Career oriented Program)	Duration of Course & Semester 1Year (140 Hrs) Odd to Even	Students opting in Semester I & III	01 Credit

The career oriented program aims at training students in the area of Bioinformatics. The students opting the programme would be trained for the algorithm and software for biological data analysis to provide new avenues and research output. To facilitate and enhance application of bioinformatics in life science research and inculcate the computational skill among students, we at Department of Biotechnology, Shree M. and N. Virani Science College are going to offers certificate course in Bioinformatics under Co-curricular courses category with following structure and design:

ELIGIBILITY AND DURATION OF THE PROGRAMME

Students enrolled in any undergraduate programme including B.Sc. Biotechnology of this college, with a good academic record, shall be eligible for admission. The course shall extend over a period of one academic year comprising of two semesters. The students of odd semester will be enrolled in the programme.

ADMISSION

Admission will be given to student on first come basis after the wide circulation of announcement and one day workshop on career prospective of this course. Personal interviews will also be conducted if the number of enrollees increases.

OBJECTIVES OF THE COURSE

- Enable the students to understand the complexity and multi-disciplinary nature of Bioinformatics and to translate that understanding into professional competence.
- Giving the students sufficient, proper and interesting information on the career paths, industries and opportunities.
- Enable students to undertake an original piece of research addressing an aspect of Bioinformatics.
- To provide practical experience to students by giving an opportunities to pursue project work in an identified area of bioinformatics.

SCHEME OF INSTRUCTION AND EVALUATION

Course Code	Course	Hrs of Instruction / Wk	Exam Duration (Hrs)	Max Marks			Credit
				CIE	CEE	Total	
Odd – Semester							
16UAECO10	**Core 1 Theory:** Basic Bioinformatics	02	03	30	20	50	
	Core 1 Practical : Basic Bioinformatics Practical	04	03	20	30	50	
Total		**06**					**01**
Even – Semester							
16UAECO10	**Core 2 Theory:** Advanced Bioinformatics	02	03	30	20	50	
	Core 2 Practical : Advanced Bioinformatics Practical	04	03	20	30	50	
Total		**06**				**200**	**01**

Odd - Semester

Core 1 Theory – Basic Bioinformatics **(25 Hrs)**

Objectives: To enable the students to

1. Receive an introduction and historical perspective to the field of bioinformatics
2. Understand of popular bioinformatics software and resources on the web
3. Get practical hands-on experience with common bioinformatics databases.

Unit.1 History, Scope and Importance : **(05 Hrs)**

- Important contributions
- Aims and tasks of Bioinformatics
- Applications of Bioinformatics-challenges and opportunities

Unit.2 Data Models and File formats : **(05 Hrs)**

- Introduction to NCBI data model
- Various file formats for biological sequences
- Bioinformatics Software and Tools

Unit.3 Biological Databases-1 : **(05 Hrs)**

- Introduction of Database and DBMS
- Types of Biological databases
- Primary sequence databases- nucleic acid and protein

Unit.4 Biological Databases-2 : **(05 Hrs)**

- Composite sequence databases-
- Protein structure databases
- Bibliographic databases

Unit.5 Scoring Schemes and Matrices : **(05 Hrs)**

- Sequence analysis of biological data
- Significance of sequence alignment
- Concept of Gap, Gap Penalty & Scoring Matrices (PAM, BLOSSUM);

Core 1 Practical: Basic Bioinformatics Practical

Objectives: To enable the students to

1. Get hands-on experience with common bioinformatics resources
2. Prepare and submit the sequences to the popular databases.
3. Understand the application of programs used for database searching, protein and DNA sequence analysis, prediction of protein function.

Laboratory Exercise **(45 Hrs)**

1. Review the Quality of the Data and View Sequence Traces
2. Assembling the Sequences and Correcting Mistakes in the Base Calls
3. Data submission Tools: WebIn, Sequin, Bankit, Sakura.
4. To build query for retrieving scientific records an d chemical structure from Pubmed, MeSH
   & PubChem database
5. Retrieving sequence records with NCBI's Entrez Nucleotides and EMBL
6. Getting the gene sequences by exploring and querying the nucleic acid databases.
7. Getting the protein sequences by exploring and querying the protein databases.
8. Sequence file formats: GenBank, FASTA, EMBL, PDB format
9. Sequence File format conversions
10. UniProt: Searching UniProt
11. Protein families and Domain database
12. 3-D Structure Databases: PDB
13. Viewing Structures with RasMol

Even - Semester

Core 2 Theory – Advanced Bioinformatics **(25 Hrs)**

Objectives: To enable the students to

1. Know theory and application of programs used for database searching, protein and DNA sequence analysis
2. Explain the major steps in pairwise and multiple sequence alignment, explain the principle for, and execute pairwise sequence alignment by dynamic programming
3. Understand the fundamentals of molecular evolution and phylogenetic analysis

Unit.1 Sequence Alignment Methods : **(05 Hrs)**

- Pairwise sequence alignment methods, Dot Plot Analysis.
- Needleman Wunsch and Smith Waterman Algorithm
- Multiple sequence alignment methods-Tools and application

Unit.2 Sequence Similarity Searches-1 : **(05 Hrs)**

- Sequence-based database searches
- BLAST- various versions and algorithm
- FASTA- various versions and algorithms,

Unit.3 Sequence Similarity Searches-2 : **(05 Hrs)**

- Interpretation of result of sequence similarity search tools
- Variants of BLAST (BLASTn, BLASTp, PSI-BLAST, PHI- BLAST, etc.
- Variants of FASTA

Unit.4 Predictive Methods Using DNA and Protein Sequences-1 : **(05 Hrs)**

- Elements and Concepts of Phylogenetic analysis
- Phylogenetic Tree of Life
- Methods of Construction of phylogenetic trees

Unit.5 Predictive Methods Using DNA and Protein Sequences-2 : **(05 Hrs)**

- Data formats and generating a data matrix
- Introduction to Parsimony
- Reliability of trees. Bootstrap, jackknife tests.

Core 2 Practical: Advanced Bioinformatics Practicals

Objectives: To enable the students to

1. Edit and detect the contaminated sequences in sequencing process
2. Visualize the sequence similarity of nucleotide and protein sequence and perform the sequence searching exercises by their own and interpret the results as well
3. Analyse the phylogenetic relationship among genic and protein sequences

Laboratory Exercise **(45 Hrs)**

1. Vector Contamination tool: Vec Screen,
2. To perform Sequence analysis by using EMBOSS: SMITH & WATER
3. To find the similarity between sequences using FASTA
4. To find the similarity between sequences using BLAST
5. To align more than two sequences and find out the similarity between those sequences: Clustal Omega, Tcofee, MUSCLE
6. Identification of conserved regions in the MSA
7. To study the phylogentic relationships of nucleotide and protein sequence(s) by using PHYLIP Package.

8. Sequence Analysis package: BioEdit
9. Sequence Analysis through biology workbench
10. 3-D Protein structure visualization and measurement of bond length, bond angle & Torsion angles using RasMol.

Reference Books :

1. Rastogi, S. C., Mendiratta, N., & Rastogi, P. (2003). Bioinformatics: Concepts, skills & applications. New Delhi: CBS & Distributor
2. Baxevanis, A.D., & Ouellette, B.F. (2001). Bioinformatics: A practical guide to the analysis of genes and proteins. New York: John Wiley & sons
3. David W.M (2004) "Bioinformatics sequence and genome Analysis", Cold spring harbor laboratory press.
4. Ignacimuthu, S. (2005). Basic bioinformatics. Harrow, Middlesex, U.K.: Alpha Science International.
5. Agostino, M. J. (2013). Practical bioinformatics. New York: Garland Science.
6. Ye, S. Q. (2008). Bioinformatics a practical approach. Boca Raton: Chapman & Hall/CRC.

Guidelines for the completion of the Course :

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms :

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

Distribution of 100% CIE components: Theory

Sr. No.	Component	Content	Duration	Marks	Sub Total
a)	Assignment-I Assignment-II	- -	- -	10 10	20
b)	Test-I	Any two units	02 Hrs	10 (set for 50)	10
c)	Course End Exam	All 5 units	02 Hrs	20 (set for 50)	20
				Grand Total	**50 Marks**

Distribution of 100% CIE components: Practical

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Observation book & record	-	-	10	10
b)	Test-I	50% of experiments	03Hrs	10 (set for 30 marks)	10
c)	Course End Exam	All experiments	04Hrs	30 (set for 60 marks)	30
				Grand Total	**50**

Remarks :

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO11/ 16IAECO11	Preparation for Competitive Exams for Academic Vertical Mobility in Life Science	Duration of Course & Semester 1Year (100 Hrs) Odd to Even	Student opting in Semester V	01 Credit

SCHEME OF INSTRUCTION & EVALUATION

Course Code	Paper no.	Paper Title	Instruction Hrs per wk	Maximum Marks			Credit
				CIE	CEE	Total	
16UAECO11	1	Life Sciences for Competitive exams	04 Hrs	70	60	200	01
	2	General Sciences for Competitive Exams	04 Hrs	70			

Paper I: Life Sciences for competitive exams

Objectives: To enable the students to

1. Able to identify solutions to problems encountered in context of competitive exam.
2. Explain and apply appropriate analytical concepts to various competitive exams.
3. Able to recognize the component of various subjects and its weightage.

Unit.1 General Biology : (10 Hrs)

- Cell organelles and their function, internal transport systems of plants and animal.
- Cellular reproduction and regulation
- Cytoskeleton, Signaling, Cancer Biology.
- populations and communities,genesis and diversity of organisms, evolution;
- Plant and animal diseases.

Unit.2 Basics of Biochemistry : (10 Hrs)

- Vitamins & Enzyme mechanisms and kinetics
- Carbohydrates structure and function catabolism & anabolism
- Protein structure, amino acid metabolism
- Fatty acid catabolism, Beta oxidation
- Fatty acid anabolism, Cholesterol & its derivatives

Unit.3 Molecular genetics : (10 Hrs)

- Problems on Mendelian principles & penetrance and expressivity
- linkage and crossing over, sex linkage
- Mutagen and mode of action, Genome organization, population genetics.
- Replication,Transcription & Translation
- Gene regulation in prokaryotes & eukaryotes

Unit.4 Microbiology & Immunology : (10 Hrs)

- General character & classification of algae, fungi & bacteria,
- Antibiotics & mode of action, bacterial genetics, archaebacteria, virus,
- Type of immunity, cell & organ of immune system, Antigen and Antibody.
- MHC, compliment system, cytokine, hypersensitivity,, vaccine,
- Autoimmunity, HIV & other immunodeficiency.

Unit.5 Applied Biotechnology : (10 Hrs)

- Basics of Microbial fermentation & Downstream processing
- Vaccine production, Basics of cell culture methods for plants
- Basics of cell culture methods for animals
- Method of DNA delivery, transgenic animals and plants
- Molecular approaches to disease diagnosis

Reference Books :

1 Hopkins, W.G. and Huner, A. (2008). Introduction to Plant Physiology. 4th edition, John Wiley and Sons. U. S.A.
2 Gyton C. and Hall J.E. (2011) Textbook of Medical Physiology, 11th edition, Elsevier, USA.
3 Odum, E.P. (2005). Fundamentals of ecology. 5th edition Cengage Learning India Pvt. Ltd., New Delhi.
4 Nelson & Cox (2013) Lenhinger. Principles of Biochemistry, 6th Edition, W. H. Freeman, USA
5 Voet & Voet (2011) Fundamentals of Biochemistry, 4th Edition, John Wiley & Sons, USA
6 Raghavan, V. (2000) Developmental Biology of Flowering plants, Springer, Netherlands
7 Cooper, G. M., & Hausman, R. E. (2000) The cell, Sunderland: Sinauer Associates.

Paper II: General Sciences for Competitive Exams

Unit.1 Physical science- I : (10 Hrs)

- Laws of Motion, Work, Energy and Power,
- Thermodynamics, Heat engine
- Gravitation, simple harmonic motion.
- Circular motion, Projectile Motion
- Work, energy & power, Friction

Unit.2 Physical Science –II : (10 Hrs)

- Optics & Dual Nature of Matter and Radiations
- Electrostatics & Current electricity
- Magnetic Effects of Current
- Electromagnetic induction
- Semiconductor Devices & logic gates

Unit.3 Chemical Science-I : (10 Hrs)

- Bohr's theory and Schrodinger wave equation
- Chemical bonding, Properties of s, p, d and f block elements, Coordination compounds
- Chemical equilibrium & kinetics, Acid-base concepts.
- Colligative properties of liquid.

Unit.4 Chemical Science-II : (10 Hrs)

- Inductive, electromeric, conjugative effects and resonance
- Mechanism of organic reactions
- Isomerism and resonance
- Chemistry of Functional Groups(alcohols, aldehydes, ketones, carboxylic acids, phenols, diazonium salts)
- Important Aromatic hydrocarbons (halides, nitro and amino compounds, phenols, diazonium salts) carboxylic and sulphonic acids.

Unit.5 Mathematical Sciences : (10 Hrs)

- Sets theory, Logarithms Complex numbers.
- Linear and Quadratic equations, Sequences and Series.
- Trigonometry, Straight lines and Circles, Conic Sections.
- Permutations and Combinations, Binomial Theorem, Matrices and Determinants, Probability.
- Functions, limits and Continuity, Differentiation & Integration.

Reference Books :

1 Agarwal, R.S. (2013) Quantitative Aptitude for Competitive Examinations, 20th edition, S Chand.
2 Morrison R.T. (2010), Organic Chemistry, 7th edition, Pearson Education,USA.
3 Lee J.D.(2008) Concise Inorganic Chemistry, Oxford; Fifth edition
4 Verma H.C.(2015) Concepts of Physics,vol-1 & 2, Bharati Bhawan,India
5 Halliday, D., Resnick, R, Walker,J. (1960) Funamental of Physics, John Wiley & Sons, Inc.

Guidelines for the completion of the Course :

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms for Preparation of Competitive Exams for Life Sciences Academic Mobility

The following are the evaluation norms for the co-curricular course under the SEC category that of the students are going to opt in any (odd) semester between I and IV.
Only theory examination will be conducted to evaluate the students in the following way.

1. Theory

Only theory exam will be of total 200 marks and will have 6 CIE components and 1 final (CEE). There will not be provision for practical exam. Total Seven tests will be conducted.

Distribution of Components of CIE:

Paper I: Life Sciences for competitive exams					
Sr.	**Component**	**Content**	**Duration**	**Marks**	**Sub Total**
1.	Test-I (End of 1st month)	1st and 2nd unit	01 Hr(MCQ)	10 (set for 50)	10
2.	Test-II (End of 2nd month)	3rd & 4th unit	01 Hr(MCQ)	10 (set for 50)	10
3.	Test-III (End of 3rd month)	All 5 units	02Hrs(MCQ)	50 (set for 100)	50
				Subtotal =	**70**
Paper II: General Sciences for competitive exams					
1.	Test-IV (End of 1st month)	1st and 2nd unit	01 Hr(MCQ)	10 (set for 50)	10
2.	Test-V (End of 2nd month)	3rd & 4th unit	01 Hr(MCQ)	10 (set for 50)	10
3.	Test-VI (End of 3rd month)	All 5units	02Hrs(MCQ)	50 (set for 100)	50
				Subtotal=	**70**
4.	**Test VII (Course End Exam)**	Paper I + Paper II	2 ½ Hrs	60 (set for 120)	**60**
				Grand Total=	**70+70+60 =200**

Remarks:

Range of % Marks	**Remarks**
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO12/ 16IAECO12	Treatment Of Environmetal Waste	80 Hrs	01 Credit

Objective: To enable the students to

1. Gain insight into the design and recycling of municipal solid waste.
2. Understand various treatments for recycling of gas and wastewater for reuse and disposal.
3. Understand the design and operation of Plastic waste-to-energy facility.
4. Develop a basic knowledge about the E-waste recycling process.

SCHEME OF INSTRUCTION & EVALUATION

Course Code	Title	Total Hrs	Maximum marks			Credit
			CIE	CEE	Total	
16UECOC12	TREATMENT OF ENVIRONMETAL WASTE	80	50	50	100	01

SYLLABUS

Unit.1 Municipal Solid Waste Treatment : (20 Hrs)

- Definition of solid waste,
- waste generation,
- sources and types of solid waste
- sampling and characterization,
- Determination of composition of MSW, storage and handling of solid waste.
- Unit operations for separation and processing, Materials Recovery facilities,
- Waste transformation through combustion and aerobic composting, anaerobic methods for materials recovery and treatment.
- Energy recovery – Incinerators

Unit.2 Waste Water Treatment : (20 Hrs)

- Sources and types of waste water.
- Physical, chemical and biological treatment of waste water:
- Primary treatment- sedimentation, primary clarifier, final clarifier, flocculation.
- Secondary treatment- Trickling filter, activated sludge process, biological tower, combined filtration and aeration process.
- Tertiary treatment - Chemical precipitation, Membrane filtration, Reverse osmosis, Ion exchange, Electro-dialysis and Effluent disinfections,
- Design aspects of effluent treatment plant (ETP),
- Concept, operation and maintenance of common effluent treatment plant (CETP).
- Reuse of treated water in industries, agriculture, oil refineries, thermal power stations and domestic uses.

Unit.3 Gas Treatment : **(10 Hrs)**

- Various sources of waste gases,
- Recovery of important gases CO_2, SO_2, NO etc.
- Recycling process: Electrostatic precipitation, bag filters, wet/dry grid arrestors.
- Absorption in liquids by Scrubbers, adsorption on solids.
- Combustion: flaring, thermal incineration, catalytic oxidation

Unit.4 Electronic Waste (E-Waste) Treatment : **(10 Hrs)**

- Sources of generation, categories, segregation, constituents of E-wastes,
- Collection and transport, recycling of e-waste and its environmental consequences,
- E-Waste (Handling and Management) Rules 2011.

Unit.5 Plastic Waste Treatment : **(20 Hrs)**

- Introduction to Plastic Waste,
- Sources, Separation processes: Primary recycling, secondary recycling, and tertiary recycling.
- Use of waste plastic as filler,
- Recycling of Various Plastics: HDPE, Acrylics, PET, PVC, Engg. Plastics, Medical Plastics.

Text Books :

1. Reddy, M.A. (2010),*Text book of Environmental Science and Technology*. India: BS Publications.
2. Hammer, M. J. and Hammer M. J. Jr., (2002),*Water and Wastewater Technology-IV*. India: Prentice Hall of India.
3. Leidner, J., (2004),*Plastic waste: Recovery of Economic Value.* USA: Marcel Dekker Inc.

Reference Books :

1. Dara, S. S., (2004). A *text book of Environmental Chemistry and Pollution Control*. India: S. Chand (G/L) & Company Ltd.
2. Rao, M. N., (1993). *Air pollution*. New York: Mcgraw Hill.
3. Kreith, F. and Tchobanoglous, G.(2002),*Handbook of Solid Waste Management*. New York: McGraw Hill Professional
4. Rao, M. N and Datta, A. K. (2012),*Wastewater Treatment.* New Delhi: IBH Publishing Company.

Guidelines for the completion of the Course :

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms :

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

Distribution of 100% CIE components :

Sr. No.	Component	Content	Marks	Sub Total
1.	**Attendance**	Min. 80 %	10	10
2.	**Assignments**	Two - Each of 10 Marks	10	20
3.	**Test**	First two units	20	20
4.	**Course End Exam**	Total syllabus Each Unit 10 Marks	50	50
		Total	**100**	**100**

Remarks:

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO13/ 16IAECO13	Entrepreneurship Development	80 Hrs	01 Credit

OBJECTIVES: To enable students to

1. Have solid introduction to the entrepreneurial process of creating new businesses.
2. Understand role of creativity and innovation in entrepreneurial start-ups, manage family-owned, context of social innovation and social entrepreneurship and issue.
3. Execute practices of financing entrepreneurial businesses.

SCHEME OF INSTRUCTION & EVALUATION

Course Code	Title	Total Hrs	Maximum marks			Credit
			CIE	CEE	Total	
16UAECO13	Entrepreneurship Development	80	50	50	100	01

SYLLABUS

Unit.1 Entrepreneurial Management : (10 Hrs)

The evolution of the concept of entrepreneurship: john kao's Model on Entrepreneurship, idea Generation, Identifying opportunities and Evaluation; building the Team/Leadership; Strategic planning of business; steps in strategic planning.

Franchising: meaning of franchising, advantages/disadvantages of franchising; type of franchise arrangement; franchise contracts; franchise evaluation checklist,

Unit.2 Creativity, Innovation And Social Entrepreneurship : (10 Hrs)

Creativity: organization actions that enhance creativity, managerial responsibilities, creative teams; sources of innovation in business; managing organizations for innovation and positive creativity.

Introduction to social entrepreneurship: characteristics and role of social entrepreneurs; innovation and entrepreneurship in a social context.

Unit.3 Family Business And Entrepreneurship : (10 Hrs)

Family business: concept, structure and kinds of family firm, culture and evolution of family firm; managing business, family and shareholder relationships; conflict and conflict resolution in the family firms;

Managing leadership: succession and continuity; women's issues in the family business encouraging changes in the family business system.

Unit.4 Financial Management : (10 Hrs)

Financing the business: arrangement of funds; traditional sources of financing, loan syndication, consortium finance, role played by commercial banks,

Support by the government; funding by the government and development bankers.

Unit.5 Entrepreneurship Development Programme (EDPs) : (10 Hrs)

Meaning and objectives, the Indian EDP model: meaning and objectives, EDP phases, Evolution of EDP, Role, Relevance and Achievement of EDP

Start-up India policy and role of government: establishing specialized institutions at national level, district industries centers, introduction of entrepreneurship courses being arranged by the government.

Practical : **(30 Hrs)**

Field Visits to training/industrial support Institutions and small enterprises

Reference Books :

1. Desai V."*Fundamental of Entrepreneurship and Small Business Management"*, Himalaya publishing House.
2. S. S. Khanka, Chand S., "*Entrepreneurial Development",*New Delhi
3. Burns P."*Entrepreneurship and Small business"*, New Jersey: Palgrave.
4. Drucker : P. F., "*Innovation and entrepreneurship* Practice and Principles". USA: Elsevier.
5. Hisrich R and Peters M. "*Entrepreneurship",* New Delhi: Tata McGraw Hill.
6. Hilt D. H. *"Entrepreneurship new venture creation"*, New Delhi; Prentice Hall of India.
7. Kaplan J. *"Patterns of entrepreneurship"*: Wiley.

Guidelines for the completion of the Course :

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms :

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

Distribution of 100% CIE components :

Sr. No.	Component	Content	Marks	Sub Total
5.	**Attendance**	Min. 80 %	10	10
6.	**Assignment**	Two - Each of 10 Marks	10	20
7.	**Test-I**	Any two units	20	20
8.	**Course End Exam**	Total syllabus Each Unit 10 Marks	50	50
		Total	**100**	**100**

Remarks :

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO14/ 16IAECO14	Quantitative Aptitude & Logical Reasoning For Industrial Placement	Total Duration 160 Hrs	01 Credit

Objectives:-To enable the students to

1. Understand the concepts of Quantitative Aptitude, mathematical logic and reasoning with emphasis on analytical ability and computational skill needed in for industrial placement.
2. Solve problems requiring Quantitative Aptitude & logical reasoning.
3. Perform well in competitive tests conducted for industrial placement.
4. Develop their Critical thinking skills, Professional skills, Social skills, Corporate specific approaches.
5. Become an accomplished employee.

SCHEME OF INSTRUCTION & EVALUATION

Course Code	Title	Total Hrs	Maximum marks			Credit
			CIE	CEE	Total	
16UAECO14	Quantitative Aptitude & Logical Reasoning For Industrial Placement	160	80	20	100	01

SYLLABUS

Unit.1 Counting Ability : **(32Hrs)**

- **Vedic Mathematics**
- Number system
- Simplification
- Square roots & Cube roots
- Mathematical operation tactics
- Surds and Indices

- **Modern Mathematics**
- Probability
- Permutation and Combination
- Applied Permutation and Combination
- Set Theory
- Progression

Unit.2 Arithmetical Ability : **(32Hrs)**

- Averages and Ages
- Ratio and Proportion
- Percentage
- Profits and Loss

- Interests
- Time, Work and Remuneration
- Pipes and Cistern
- Speed, Time and Distance

Unit.3 Reasoning Ability : (32Hrs)

➢ **Analytical Reasoning**
- Coding and Decoding
- Comparisons and Rankings
- Sitting Arrangement
- Selection and Matching
- Sequencing
- Syllogism

➢ **Critical Reasoning**
- Statement and Assumption
- Statement and Conclusion
- Statement and Strong/Weak Argument
- Cause and Effects

Unit.4 Arithmetical Reasoning, Geometry And Mensuration : (32Hrs)

➢ **Arithmetical reasoning**
- Mathematical Puzzles
- Calendar
- Clock
- Direction Sense

➢ **Geometry**
- Lines and Angle
- Triangle
- Square
- Circle

➢ **Mensuration**
- Area
- Volume

Unit.5 Capabilities : (32Hrs)

➢ **Intra-Personal Skills**
- Self Awareness
- Self Analysis and Assessment
- Goal Setting
- Self Management
- Self Motivation
- Attitude
- Ethics and Values
- Study Skills/Habits etc.

➢ **Inter-Personal Skills**
- Emotional Intelligence (Emotional Management)
- Communication Skills(Presentation Skills)

- Team Working Skill
- Volunteerism
- Problem Solving Skills/ Creativity Skills.
- Making Decision Skill.
- Time and Stress Management etc.

- **Case Studies**
- Implementation of Whole Personality
- **Resume**

Text Books :

1. Dr. R.S.Agarwal, Quantitative Aptitude, S.Chand publication
2. Jaikishan and Preamkishan , Test of Reasoning, Arihant publication.
3. Rajesh Varma, Objective Arithmetic, Arihant publication.

Reference Books :

1. Chandresh Agrawal's, Reasoning (verbal & non verbal), Shri Shyamsunder publication
2. B.S.Sijiwali and Indu Sijiwali, A New Approch to reasoning, Arihant publication
3. Brijesh Tripathi, Dr. Satyajeet Rawat and Neetika Goyal, Pathfinder for CDS Examination, Arihant publication.

Guidelines for the completion of the Course :

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms :

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

Distribution of 100% CIE components :

S.No.	Component	Content	Duration if any	Mark	Sub Total
1.	Attendance	Min. 80%	For full 160 Hrs course	10	10
2.	Assignments	Two - each of 10 marks		10	20
3.	Test – I to V	Each test of 10 marks from each unit	-	10	50
4.	Course End Exam	Full syllabus of the theory	1 Hr	20	20
				Total	**100**

Remarks :

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO15/ 16IAECO15	Medical Laboratory Techniques (MLT) (Career Oriented Program)	140 Hrs	01 Credit

Semesters I-II/III - IV

DURATION OF THE PROGRAMME

The programme shall extend over a period of one year comprising of two semesters. Each semester normally consists of 1 theory paper and 12-13 Practicals.

OBJECTIVES OF THE PROGRAMME

Medical Laboratory Technician program will expose students to the exciting and rewarding world of the medical laboratory. The medical lab offers a unique combination of technical employment and the satisfaction of working with a diverse client population.

With the role of the medical technician expanding, there are numerous opportunities for full- and part-time employment in both clinics and hospital laboratories. In addition, career opportunities exist in government, research and veterinary laboratories.

Emphasis is placed on becoming proficient in the collection of blood samples, performing ecgs, the use of laboratory equipment and fluency in medical terminology, while developing the professional attitude and demeanor needed for close patient contact. Excellent communication skills and good interpersonal skills are essential.

The theoretical and practical portions of this program are completed within a year. The compressed delivery format makes this program an ideal choice for those who wish to quickly enter the workforce.

SCHEME OF INSTRUCTION AND EXAMINATIONS

Course Code	Course	Hrs of Instruction / Wk	Exam Duration (Hrs)	Max Marks			Credit
				CIE	CEE	Total	
Odd – Semester							
16UAECO15	**Core 1 Theory:** Hematology	02	03	30	20	50	
	Core 1 Practical : Hematology Practicals	03	03	20	30	50	
Total		**05**					**01**
Even – Semester							
16UAECO15	**Core 2 Theory:** Clinical Chemistry	02	03	30	20	50	
	Core2 Practical : Clinical Chemistry Practical	03	03	20	30	50	
Total		**05**				**200**	**01**

Odd Semester

Core 1 Theory: Hematology

Objective : To enable the students to

1. Develop the knowledge, attitudes and skills in the performance of clinical laboratory procedures needed to help the physician in the proper diagnosis, treatment, prognosis and prevention of diseases;
2. Develop skills in critical and analytical thinking to advance knowledge in Medical Technology/Clinical Laboratory Science and contribute to the challenges of the profession.

Unit.1 Hematology : (4 Hrs)

- Introduction to blood
- Phlebotomy

Unit.2 RBC : (4 Hrs)

- Structure and function
- Process of erythropoesis
- disorders of RBC and its counting

Unit.3 WBC : (4 Hrs)

- classification and Functions of WBCs
- Clinical significance of total WBC count
- Differential count of WBC

Unit.4 Hemoglobin : (4 Hrs)

- Hb –types, function and synthesis
- Fate of Hb and its clinical significance

Unit.5 Blood Coagulation : (4 Hrs)

- Platelet structure and function
- Coagulation cascade
- Bleeding disorder

Hematology Practicals

Objective: To enable the students to

1. Achieve competency in routine clinical laboratory procedures

2. Utilize procedures to obtain and determine normal values and clinical significance of components present in blood.

List of Practicals:

1. Introduction to Hematology
2. Phlebotomy
3. Hemoglobin Estimation
4. Introduction to Neubaur Chamber
5. Total Count of RBC & WBC
6. Introduction to differential WBC count
7. Identification and counting of neutrophils
8. Identification and counting of eosinoplil
9. Identification and counting of basophils
10. Identification and counting of monocyte
11. Identification and counting of lymphocyte
12. Bleeding Time and Clotting Time
13. Packed cell volume

Text Book :

Godkar, P. B., & Godkar, D. P. (2006). Textbook of medical laboratory technology. Bhalani publishing house.

Reference Books :

1. Waugh, A., & Grant, A. (2014). Ross & Wilson anatomy and physiology in health and illness. Elsevier Health Sciences.

2. Sembulingam, K., & Sembulingam, P. (2012). Essentials of medical physiology. JP Medical Ltd.

Even Semester

Core 2 Theory: Clinical Biochemistry

Objective :To enable the students to

1. Develop the knowledge, attitudes and skills in the performance of clinical laboratory procedures needed to help the physician in the proper diagnosis, treatment, prognosis and prevention of diseases;
2. Develop skills in critical and analytical thinking to advance knowledge in Medical Technology/Clinical Laboratory Science and contribute to the challenges of the profession

Unit.1 Clinical Biochemistry laboratory Instrumentation : (4 Hrs)

- Importance of analyzer and different types of analyzer used in labs
- Various modes to operate the analyzer
- Importance of clinical chemistry

Unit.2 Lipid Profile : (4 Hrs)

- Types and Importance of lipid profile
- Clinical significance of lipoproteins
- Atherosclerosis and Hypertriglycredemia
- HDL and other lipoproteins

Unit.3 Renal Function Tests & Diabetes Mellitus : (4 Hrs)

- Brief Anatomy & Physiology of Kidney
- Clinical Significance of Renal Function Tests
- Types of Diabetes
- Clinical Significance of increased blood sugar level

Unit.4 Cardiac Function : (4 Hrs)

- Myocardial Infarction
- Importance of Cardiac function test
- CK-MB and its significance

Unit.5 Liver Function Tests : (4 Hrs)

- Types of Jaundice
- Bilirubin Extimation
- Clinical Significane of alkaline Phosphatase & SGPT

Clinical Biochemistry Practicals

Objective: To enable the students to

1. Achieve competency in routine clinical laboratory procedures
2. Utilize procedures to obtain and determine normal values and clinical significance of components present in blood.

List of Practicals:

1. Principle & Working of Semi Auto Analyzer
2. Estimation of Blood glucose
3. Estimation of alkaline phosphatase

4. Estimation of bilirubin
5. Estimation of urea
6. Estimation of uric acid
7. Estimation of SGPT
8. Estimation of total protein- albumin
9. Estimation of cholesterol
10. Estimation of HDL
11. Estimation of Triglyceride
12. Physical, Chemical & Microscopic analysis of urine by manual and uristick method

Text Book :

Godkar, P. B., & Godkar, D. P. (2006). Textbook of medical laboratory technology. Bhalani publishing house.

Reference Books :

1. Waugh, A., & Grant, A. (2014). Ross & Wilson anatomy and physiology in health and illness. Elsevier Health Sciences.
2. Sembulingam, K., & Sembulingam, P. (2012). Essentials of medical physiology. JP Medical Ltd.

Guidelines for the completion of the Course :

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. Only remarks will be given at the end of the course.
3. A separate certificate on completion of each course will be issued by the CoE.
4. Degree will be awarded only after receiving of the certificate.
5. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms :

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

For One Semester:

Distribution of 100% CIE components: Theory

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance	-	-	10	10
b)	Assignment-I	- -	- -	10	10
c)	Test-I	Any two units	02 Hrs	10 (set for 50)	10
d)	Course End Exam	All 5 units	02 Hrs	20 (set for 50)	20
				Grand Total	**50 Marks**

Distribution of 100% CIE components: Practical

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Attendance & Record Book	-	-	10	10
b)	Test-I	50% of experiments	03Hrs	10 (set for 30 marks)	10
c)	Course End Exam	All experiments	04Hrs	30 (set for 60 marks)	30
				Grand Total	**50**

Remarks :

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO16/ 16IAECO16	General Awareness	80 Hrs	01 Credit

General Awareness is introduced as a co-curricular course with the following objectives.

1. To train in General Awareness for the various levels of competitive examinations.
2. To provide latest information about the concepts of different fields
3. To enable the students to be updated on several common fields.

SYLLABUS

Entire content is classified into following categories:

Sr. No.	Category	Number of Questions per Category
1	Science	500
2	History and Culture	250
3	Sports (Global, National)	250
4	Current Affairs	250
5	Civic and Social Reforms, Constitution	250
6	Geography	250
7	Literary Works	250

The content of the above categories is in the form of Multiple Choice Questions (MCQ). Care has been taken to see that the stem is prepared correctly with proper distractors. The number of distracters for each question is three and the fourth would be the correct answer.

The MCQs are in English and also translated into Gujarati. The purpose of dual language of MCQs is to prepare students to appear for competitive examinations at global, national, and state levels.

The material for the study would be available for the students in the form of a book, or as a soft copy.

Blue print of question paper and evaluation

Every student registered for the course would prepare for the examination through self study. There would be no Continuous Internal Evaluation (CIE).The student would appear only for the Course End computer based examination.

- Duration of exam - 60 minutes
- Number of questions - 100 MCQs
- Marks per question - 1 Mark
- Total marks of CEE - 100

Supplementary examinations would be conducted depending upon the requirements from time to time.

At the end of the course no marks are given, only remarks are given as follows:

Remarks:

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO17/ 16IAECO17	Gandhian Studies	80 Hrs	01 Credit

Objectives: To enable the students to

1. acquaint with the major issues related to Gandhi's theory of life.
2. critically examine the role of Gandhiji in the Freedom movement.
3. understand the correlation between Sarvodaya, Swaraj and Swadesh.
4. understand how Gandhi's World view provides an alternative to prevalent ones.
5. understand Gandhi's view on Science & Technology.

SCHEME OF INSTRUCTION & EVALUATION

Course Code	Title	Total Hrs	Maximum marks			Credit
			CIE	CEE	Total	
16UAECO17	Gandhian Studies	80	60	40	100	01

SYLLABUS

Unit 1: Gandhi's Life & Philosophy (8 Hrs)

- Chronology of Gandhi's Life
- Autobiography
- Gandhi's Non-Violence & Truth
- Eleven Vows: Satya or Truth, Ahimsa or nonviolence, Brahmacharya or celibacy, Asteya or nonstealing, Asangraha or nonpossession, Sharir Shram or bread labour, Aswada or control of palate, Bhayavarjana or fearlessness, Sarva Dharma Sambhav or religious equality, Swadeshi or use of local products, and Sparsh Bhavana or removal of untouchability.

Unit 2: Gandhi and the freedom Movement (8 Hrs)

- Gandhi's role in Indian Freedom Movement
- Advent of Gandhi in Indian polities
- How Gandhi : converted Indian National Congress into a mass organization and changed the Congress agenda
- Major struggles : Non-cooperation Movement, Civil Disobedience, Quit India – (A chronological survey of the history of Indian Freedom; Movement focusing on Gandhi's role)

Unit 3: Constructive Programme **(8 Hrs)**

- Concept & ideals of Sarvodaya
- Regeneration of Society
- Health & Hygiene
- Swadeshi & Swaraj;
- What is Swaraj ?
- Self control – self rule and self realization
- Popular concepts of Swaraj
- How Gandhi redefined the concept of Swaraj ? Significance of Gandhi's concept of Swaraj; Swaraj and Swadeshi
- Gandhi's concept of Swadeshi
- Swaraj though Swadeshi

Unit 4: Gandhi on Science & Technology **(8 Hrs)**

- Gandhi as a Scientist
- Gandhi's idea of Science & technology
- Appropriate Technology
- Life Science
- Gandhi's idea of Life & health
- Gandhi's Experiment with food
- Nature Cure

Unit 5 : Gandhi's Worldview as an alternative **(8 Hrs)**

- Prevalent world views: materialistic and idealistic – their limitations
- Need for alternative
- Gandhi's Worldview as a (w)holistic alternative

References:

1. Tendulkar, D. G. (1952). Mahatma, *Life of Mohandas Karamchand Gandhi*, Vol. IV, Vithalbhai K. Jhaveri & DG Tendulkar, Bombay, 108-109.
2. Devadoss, T.S. (1974). *Sarvodaya and the Problem of Political Sovereignty,* University of Madras
3. Kumarappa, J. C. (1945). *Economy of Permanence*. Sarva-Seva-Sangh-Publs.; Raj Ghat, Kashi..
4. Galtung, J. (1996). *Peace by Peaceful Means*. London: Sage.
5. Parekh, B. C. (1989). *Gandhi's Political Philosophy: a Critical Examination*. Springer.
6. Datta D. M. (1953) *The Philosophy of Mahatma Gandhi,* The University of Wisconsin Press, Madison.
7. Louis, F. (1950). *The Life of Mahatma Gandhi* (Vol. 283). Harpercollins.
8. Gandhi, M. (1948). *Why the Constructive Programme*. AJ Kishore.

Guidelines for the completion of the Course:

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. In order to complete the course the student must complete the following compulsory components:
   - Course End Exam
   - One Assignment(Written / Report of field visit/ Any other activity)
   - Field work/ Survey/ Project/ Activity
3. Only remarks will be given at the end of the course.
4. A separate certificate on completion of each course will be issued by the CoE.
5. Degree will be awarded only after receiving of the certificate.
6. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms:

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

Theory

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Test-I	First 2 Units	2 Hrs	20 (set for 40)	20
b)	Course End Exam (CEE)	All 5 Units	3 Hrs	40 (set for 80)	40
				Total	**60 Marks**

Practical

S. No.	Component	Content	Duration	Marks	Sub Total
a)	Assignment -1	Written/Field Visit/ Report/Posters/ Exhibition	In 1st 40 hrs	10	10
b)	Assignment-2	Field work/ Survey/ Project/ Activity	In 2nd 40 hrs	30	30
				Total	**40 Marks**
				Grand Total	**100 Marks**

Blue Print for Test-I (Set for 40 & Convert to 20)

Part A: 1 mark questions 1 X 10 =10

Part B: 8 marks questions 8 X 2 = 16

Part C: 10 marks questions 10 X 2 =20

Blue Print for CEE (Set for 80 & Convert to 40)

Part A: 1 mark questions 1 X 10 =10

Part B: 6 marks questions 6 X 5 = 30

Part C: 8 marks questions 8 X 5 =40

At the end of the course no marks are given, only remarks are given as follows:

Remarks:

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

16UAECO18/ 16IAECO18	Woman Studies	80 Hrs	01 Credit

Objectives: To enable the students to

1. understand the concept and need for women Studies.
2. understand the status and role of women and society in India.
3. know the importance of women's health and the initiatives taken by the Government to ensure the healthy status of Women in India.
4. understand the status of women in education, economics, entrepreneurship and Leadership
5. understand the Women's Rights in the Indian Constitution.

SCHEME OF INSTRUCTION & EVALUATION

Course Code	Title	Total Hrs	Maximum marks			Credit
			CIE	CEE	Total	
16UAECO18	Women Studies	80	60	40	100	01

SYLLABUS

Unit 1. Introduction to Women studies (8 Hrs)

- Concept & need for Women Studies.
- Scope of Women Studies – for Knowledge, empowerment, development and career.
- Women Studies as an interdisciplinary area and emerging discipline.
- Gender Studies – Role of genders in society and family.
- Gender Equality – in family, society, education, development, career, decision-making.

Unit 2. Women and Society in India (8 Hrs)

- Women from Vedic times to present era.
- Women and family – changing role of women; marriage, motherhood, single parent, widowhood.
- Girl child in Society – female foeticide, female infanticide, psychological, emotional and heath support to the girl child.
- Women as custodians of Universal Human Values.

Unit 3. Women and Health (8

Hrs)

- Health status of women in India – prevalence; Woman & Nutrition; Mortality and morbidity indices, comparison to global status of women's health
- National Health and Population Policies and Programmes – Maternal and Child Health (MCH) to Reproductive and Child health Approaches; Concerns of old age
- HIV and AIDS Control Programme

Unit 4. Women and Development (8 Hrs)

- Women and education for empowerment – status of women's education in India; formal, non-formal and vocational education for women; adult literary for women's development.
- Women and economic development – new Economic Policy and impact on women's employment; alternative approaches – Women in Development (WID), Women and Development (WAD), gender and Development (GAD) – Policies and Programmes.
- Women and entrepreneurship – Importance of entrepreneurship, entrepreneurial traits, factors contributing to women entrepreneurship; training, skilling and income generation as individuals and groups (micro entrepreneurs and Self-Help-Groups).
- Women and leadership – women and social roles, women and career, women and Management roles; NGOs and women development; Political role and participation of women and Panchayati Raj

Unit 5. Legislation and Gender Justice (8 Hrs)

- Women's Rights in the Indian Constitution – Fundamental Rights and Directive Principles
- Human Rights as Women's Rights.
- Perfective Legislation for Women – Anti Dowry Act, SITA, PNDT and Visaka, Domestic Violence Prevention Act.
- Women's Rights in Property and Uniform Civil code.
- National and International Funding Agencies for Women's Development.

References

1. Aggrawal, N. (2002). *Women and law in India*. New Delhi: New Century Pub.
2. Bhasin, K. (2003). *Understanding gender.* New Delhi: Women Unlimited.
3. Desai, N & Krishna Raj. (1990). Introduction. *Women and society in India* (pp.1-22). Delhi: Ajanta Publications.
4. Desai, N, & Maithreyi Krishnaraj. (2004). An overview of the status of women in India. In Manoranjan Mohanty (Ed) *Class, caste, gender- Readings in Indian Government and Politics-5P* (296-319). New Delhi: Sage Publications.
5. Desai, N, & Vina Mazumdar. (2003). From Women's Education To Women's Studies: The Long Struggle For Legitimacy. In Devaki Jain and Pam Rajput (Eds) *Narratives from Women's Studies family - Recreating knowledge* (pp 44-77). New Delhi: Sage Publications.
6. Goonesekere, S. (Ed). (2004). *Violence, Law And Women's Rights In South Asia.* New Delhi: Sage
7. Maswood, S. (2004). *Laws Relating To Women.* New Delhi: Orient Law House.

8. Schuler, M., & Kadirgamar, S. R. (1992). *Legal Literacy As A Tool For Women's Empowerment*. In M. Schuler, & S. R. Kadirgamar (Eds.), *Legal literacy: A tool for women's empowerment* (pp. 21-70). New York: UNIFEM.
9. Siddiqi, F.E. & Ranganathan, S. (2001). *Handbook On Women And Human Rights.* New Delhi: Kanishka Publishers
10. Stone, L., & James, C. (2011). *Dowry, Bride-Burning, And Female Power In India*. In C. B. Brettell, & C. F. Sargent (Eds.), *Gender in cross-cultural perspective* (5 ed., pp. 308-317). New Delhi: PHI Learning Private Limited.

Guidelines for the completion of the Course:

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme Coordinator and Principal will be allowed to compensate in the next year.
2. In order to complete the course the student must complete the following compulsory components:
   - Course End Exam
   - One Assignment (Written / Report of field visit/ Any other activity)
   - Field work/ Survey/ Project/ Activity
3. Only remarks will be given at the end of the course.
4. A separate certificate on completion of each course will be issued by the CoE.
5. Degree will be awarded only after receiving of the certificate.
6. In event of non-completion of course, the student has to re-do the course or opt for another one.

Evaluation Norms:

The course carries 1 credit and the students will be evaluated continuously based on their participation in learning experiences, theory, and evaluation through tests and assignments and will also be evaluated at the end of course under CEE which will be 100% internal. The pattern of evaluation with percentage weightage will be as specified below:

Distribution of 100% CIE components:

Theory					
S. No.	**Component**	**Content**	**Duration**	**Marks**	**Sub Total**
a)	Test-I	First 2 Units	2 Hrs	20 (set for 40)	20
b)	Course End Exam (CEE)	All 5 Units	3 Hrs	40 (set for 80)	40
				Total	**60 Marks**

Practical					
S. No.	**Component**	**Content**	**Duration**	**Marks**	**Sub Total**
a)	Assignment -1	Written/Field Visit/ Report/Posters/ Exhibition	In 1st 40 hrs	10	10

b)	Assignment-2	Field work/ Survey/ Project/ Activity	In 2nd 40 hrs	30	30
				Total	**40 Marks**
				Grand Total	**100 Marks**

Blue Print for Test-I (Set for 40 & Convert to 20)

Part A: 1 mark questions 1 X 10 =10

Part B: 8 marks questions 8 X 2 = 16

Part C: 10 marks questions 10 X 2 =20

Blue Print for CEE (Set for 80 & Convert to 40)

Part A: 1 mark questions 1 X 10 =10

Part B: 6 marks questions 6 X 5 = 30

Part C: 8 marks questions 8 X 5 =40

At the end of the course no marks are given, only remarks are given as follows:

Remarks:

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

Shri Manibhai Virani & Smt. Navalben Virani Science College- Autonomous, Rajkot

Affiliated to Saurashtra University, Rajkot

Communication Skill & Soft Skill

Skills and knowledge are driving forces of economic growth and social development for any country. In parallel to maintaining an academic awareness of the field, adapting skills and attitudes is now inevitable to success, and will prove all the more critical in the years to come.

India is poised to standout as one of the skilled nations in coming years and it's time for Higher Education & Skill Training to exist in same of curriculum. To enable this, it is very important for the Industry and Academia to work together to generate focussed hands- on candidates with right blend of learning and employability traits.

Life skills allow students to apply the knowledge they acquire to real world problems and situations. The ability to think abstractly and approach problems from multiple angles to find practical solutions, and the skill to communicate clearly and effectively are just as important as technical knowledge in a particular field or academic subject. Having life skills is an essential part of being able to meet the challenges of everyday life.

Life skills provide important tools for development, such as independent thinking, how to socialize and make new friends, and how to take action in situations. Building life skills is essentially an exercise in helping develop sound judgment and good habits for long-term stability, wellness, and success.

It is important for higher education institutions to supplement the curriculum to make students better prepared to meet industry demands as well as develop their own interests and aptitudes. These courses are conducted to help students stand apart from the rest in the job market by adding further value to their resume.

Communication Skill and Soft Skill courses are a fine way to fill the gaps in the knowledge and add competitive edge to the job prospects. As systems, programs and practices change, making it critical for job-seekers to have a range of competencies, these courses can help to be a winner.

- **Ability Enhancement Courses (AEC)** are very important part of the structure**.** The Ability Enhancement (AE) Courses are of two kinds (**Ref**: UGC Curriculum Framework):
  1) Ability Enhancement Compulsory Courses (AECC) and
  2) Skill Enhancement Courses (SEC)

SEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc.

❖ Communication Skill & Soft Skill:

Communication skills are needed to speak appropriately with a wide variety of people whilst maintaining good eye contact, demonstrate a varied vocabulary and tailor your language to your audience, listen effectively, present your ideas appropriately, write clearly and concisely, and work well in a group. Many of these are essential skills that most employers seek. Having strong communication skills aids in all aspects of life – from professional life to personal life and everything that falls in between. From a business standpoint, all transactions result from communication. Good communication skills are essential to allow others and yourself to understand information more accurately and quickly.

Soft skills are increasingly becoming the hard skills of today's workforce. It's just not enough to be highly trained in technical skills, without developing the softer, interpersonal and relationship-building skills that help people to communicate and collaborate effectively. Teamwork, leadership, and communication are underpinned by soft skills development. Since each is an essential element for organizational and personal success, developing these skills is very important.

❖ Objective of Communication Skill & Soft Skill:

The purpose of the Communication Skill & Soft Skill is to give the students firsthand experience of the content. Providing the finishing touches to the knowledge gained in the degree program. Teamwork, leadership, and communication are underpinned by these skills development. Since each is an essential element for organizational and personal success, developing these skills will benefit the students a lot.

❖ Eligibility

Courses are open for all UG Programs. The eligibility for Communication Skill and Soft Skill is as following.

Communication Skill: < 60 % marks in English in Semester 1, 2 & 3

Soft Skill: > 60% marks in English in Semester 1, 2 & 3

❖ Selection and Registration

An orientation program has been arranged for all Semester IV students. The presentation of coordinator helped the students to get highlights and insight of the course what they will learn. The list of all the students enrolled in CS or SS is sent to all HoDs to display on the departmental notice board.

Communication Skill & Soft Skill courses are offered under **Skill Enhancement Courses (SEC) – II** in **Part III** in Curriculum of all **UG Programmes** in semesters **IV** to **V.**

❖ **Unique Features of Communication Skill & Soft Skill**

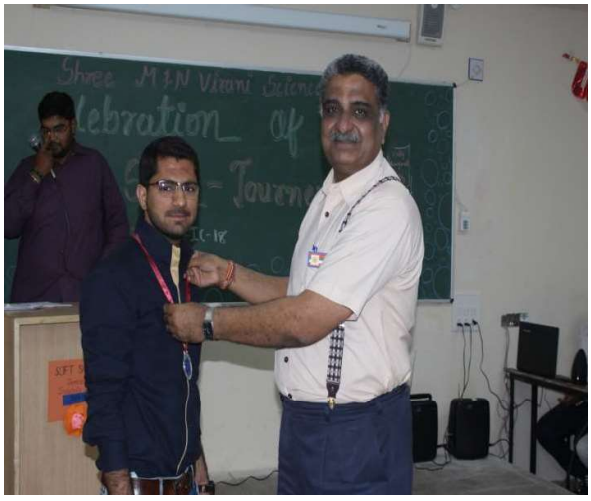
- Activity Based Content
- Student centric course
- Builds the confidence
- Removes stage fear
- Increases the involvement of the students
- Enhances Leadership quality
- Supports the creativity
- Motivates the young minds to be active in the class
- Identifies the hidden abilities of the receivers

❖ **Teaching Learning methods:**

- Role Playing
- Story Telling
- Team building games
- Various Activities outside the classroom
- Quiz
- Puzzles
- Drama Enactment
- Presentations

❖ Achievement of Communication Skill & Soft Skill

The course enabled the students to organize the entire event which set an example of the success of the course. The entire event was managed by students which made them more confident in themselves. This became possible because of the constant motivation and support rendered to them in the sessions. The talent, leadership, enthusiasm, zeal reached to its peak and the students demonstrated the completion successfully.



COMMUNICATION SKILL Year -1						
Name of the course	Course Code (if any)	Year of offering	No. of times offered during the same year	Duration of course	Number of students enrolled in the year	Number of Students completing the course in the year
COMMUNICATION SKILL- I	16AUECS01	2017-18	1	24 hrs	372	289
COMMUNICATION SKILL- II	16AUECS02	2017-18	1	24 hrs	372	277
COMMUNICATION SKILL Year -2						
COMMUNICATION SKILL- I	16AUECS01	2018-19	1	24 hrs	385	359
COMMUNICATION SKILL- II	16AUECS02	2018-19	1	24 hrs	355	348
COMMUNICATION SKILL Year -3						
COMMUNICATION SKILL- I	16AUECS01	2019-20	1	24 hrs	51	43
COMMUNICATION SKILL- II	16AUECS02	2019-20	1	24 hrs	51	43
COMMUNICATION SKILL Year -4						
COMMUNICATION SKILL- I	16AUECS01	2020-21	1	24 hrs	25	25
COMMUNICATION SKILL- II	16AUECS02	2019-20	1	24 hrs	25	25
COMMUNICATION SKILL Year -5						
COMMUNICATION SKILL- I	16AUECS01	2021-22	1	24 hrs	71	71
COMMUNICATION SKILL- II	16AUECS02	2019-20	1	24 hrs	71	71

SOFT SKILL Year -1						
Name of the course	Course Code (if any)	Year of offering	No. of times offered during the same year	Duration of course	Number of students enrolled in the year	Number of Students completing the course in the year
SOFT SKILL-I	16AUESS01	2017-18	1	24 hrs	279	218
SOFT SKILL-II	16AUESS02	2017-18	1	24 hrs	279	220
SOFT SKILL Year -2						
SOFT SKILL-I	16AUESS01	2018-19	1	24 hrs	557	552
SOFT SKILL-II	16AUESS02	2018-19	1	24 hrs	542	541
SOFT SKILL Year -3						
SOFT SKILL-I	16AUESS01	2019-20	1	24 hrs	123	123

SOFT SKILL-II	16AUESS02	2019-20	1	24 hrs	51	43
SOFT SKILL Year -4						
SOFT SKILL-I	16AUESS01	2020-21	1	24 hrs	224	224
SOFT SKILL-II	16AUESS02	2020-21	1	24 hrs	224	224
SOFT SKILL Year -5						
SOFT SKILL-I	16AUESS01	2021-22	1	24 hrs	140	140
SOFT SKILL-II	16AUESS02	2021-22	1	24 hrs	140	140

Shree Manibhai Virani and Smt. Navalben Virani Science College (Autonomous), Rajkot
Affiliated to Saurashtra University, Rajkot

Revised Syllabus of Environmental Science

For Students Admitted from A.Y. 2017-2018 & Onwards

16UAEES01	**AECC I: Environment Science**	**1 hrs/wk (per sem.)**	**2 Credits (1 Credit/sem.)**

Objectives :

1. Develop the concern to act at their own level to protect the environment.
2. Understand the need to lead more sustainable lifestyle and the need to use resources more equitably.
3. Understand ecosystems and energy flow in the ecosystem.
4. Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
5. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
6. Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.

Semester – I (Unit – 1 & 2)

Unit – 1: Basics of Environmental studies & Natural Resources (09 Lectures)

1.1. Definition, scope and importance of Environmental studies, Need for public awareness
1.2. Renewable and non-renewable resources
1.3. Natural resources, associated problems and Role of an individual in conservation of natural resources:

(a) **Forest resources:** Use and over-exploitation, Deforestation, Case studies, Timber extraction, Mining, Dams and their effects on forest and tribal people.
(b) **Water resources:** Use and over-utilization of surface and ground water, Floods, Drought, Conflicts over water, Dams-benefits and problems.
(c) **Mineral resources:** Use and exploitation, Environmental effects of extracting and using mineral resources, Case studies.
(d) **Food resources:** World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, Case studies.
(e) **Energy resources:** Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, Case studies.
(f) **Land resources:** Land as a resource, Land degradation, Man induced landslides, Soil erosion and desertification.

Unit – 2: Ecosystems (09 Lectures)

2.1. Concept, Structure and function of an ecosystem.
2.2. Producers, Consumers and decomposers, energy flow in the ecosystem.
2.3. Food chains, food webs, ecological pyramids
2.4. Ecological succession
2.5. Introduction, types, characteristic features, structure and function of the following ecosystem:
   (a) Forest ecosystem
   (b) Grassland ecosystem
   (c) Desert ecosystem
   (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Semester – II (Unit – 3 to 5)

Unit – 3: Biodiversity and its Conservation (08 Lectures)

3.1. Introduction – Definition: genetic, species and ecosystem diversity, value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
3.2. Biodiversity at global, National and local levels, Biogeographical classification of India, India as a mega-diversity nation
3.3. Hot-sports of biodiversity
3.4. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India
3.5. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Unit – 4: Environmental Pollution & Human Population (12 Lectures)

4.1. Definition, Cause, effects and control measures of :
   (a) Air pollution
   (b) Water pollution
   (c) Soil pollution
   (d) Marine pollution
   (e) Noise pollution
   (f) Thermal pollution
   (g) Nuclear hazards
4.2. Solid waste Management: Causes, effects and control measures of urban and industrial wastes, role of an individual in prevention of pollution, Pollution case studies, Disaster management: floods, earthquake, cyclone and landslides.
4.3. Population growth, variation among nations, Population explosion – Family Welfare Programme.
4.4. Human Rights & Value Education, HIV/AIDS, Women and child Welfare.

Unit – 5: Social Issues and the Environment (06 Lectures)

5.1. Environmental ethics: Issues and possible solution

5.2. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies, Wasteland reclamation, Consumerism and waste products.

5.3. Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness.

Field work – Visit Report / Project Report (Field work equal to 5 lecture hours)

1. Visit to a local area to document environmental assets river / forest / grassland / hill / mountain etc.
2. Study of simple ecosystems-pond, river, hill slopes, etc.
3. Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
4. Study of common plants, insects, birds, animals etc.

Text Book:

1. Bharucha, E. (2005). Textbook of Environmental Studies for undergraduate courses. Universities Press.

Reference Books:

1. Agarwal, K. C. (2001). Environmental Biology, Nidi Publ. Ltd. Bikaner
2. Bharucha, E. (2002). The Biodiversity of India (Vol. 1.). Mapin Publishing Pvt. Ltd.
3. Encyclopedia, E. (1991). Jaico Publishing House.
4. Hawksworth, D.L., Kalin-Arroyo, M. T., Heywood, V. H., & Watson, R. T. (1995). Global biodiversity assessment. Cambridge University Press.
5. Jadhav, H. V. (2006). Environmental Protection and laws. Himalaya publishing house.
6. Miller, G. T. (1993). Environmental science : sustaining the earth. In Wadsworth biology Series. Wadsworth Publishing Company.

Shree Manibhai Virani and Smt. Navalben Virani Science College (Autonomous), Rajkot
Affiliated to Saurashtra University, Rajkot

Part – III Ability enhancement compulsory Course – I
Environment Science

Revised Evaluation Norms

For UG Student admitted from 2017-18 & onwards

The components and distribution of marks be as indicated below.

Semester - I				
S.N.	**Component**	**Content**	**Test Duration/Number**	**Total Marks**
1.	Assignment - 1	Unit – I & II	01 Number	10
2.	Test - 1		1 hr	20
			Total Marks Sem. - I	**30**
Semester - II				
S.N.	**Component**	**Content**	**Test Duration/Number**	**Total Marks**
1.	Assignment - 2	03 Units (Unit – III, IV, V)	01 Number	10
2.	Test - 2	Unit – III, IV	1 hr	20
3.	Test - 3	All 05 Units	1.5 hrs	30
4.	Field visit Report	Unit – I to V	-	10
			Total Marks Sem. – II	**70**
			Total Marks	**100**

At the end of the year no marks are given, only remarks be given as follows:

Range of Marks	**Remarks**
90 - 100	Excellent
75 – 89	Very Good
60 – 74	Good
40 – 59	Fair
39 and below	Not completed

Compulsory Components

- Test 1, 2 & 3
- Assignment 1 & 2
- Field visit Report

If any of the above are not completed, the student cannot complete the course, inspire of securing the passing minimum of 40 marks.

Note:

- Test – 1 will be conducted with 2nd CIE of Sem. – 1
- Test – 2 will be conducted with 2nd CIE of Sem. – 2
- Test – 3 will be conducted with SEE of Sem. – 2

Shri Manibhai Virani and Smt. Navalben Virani Science College (Autonomous), Rajkot
Revised Syllabus of Environmental Science
For Student Admitted from A.Y. 2019-20& Onwards

AECC I: Environmental Science	1 hrs/wk (per sem.)	2 Credits (1 Credit/sem.)

Objectives:

1. Develop the concern to act at their own level to protect the environment.
2. Understand the need to lead more sustainable lifestyle and the need to use resources more equitably.
3. Understand ecosystems and energy flow in the ecosystem.
4. Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
5. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
6. Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.

Semester – I (Unit – 1 & 2)

Unit – 1: Basics of Environmental studies & Natural Resources (09 Lectures)

1.1. Definition, scope and importance of Environmental studies, Need for public awareness
1.2. Renewable and non-renewable resources
1.3. Natural resources, associated problems and Role of an individual in conservation of natural resources:

(a) **Forest resources:** Use and over-exploitation, Deforestation,Timber extraction, Mining, Dams and their effects on forest and tribal people.
(b) **Water resources:** Use and over-utilization of surface and ground water, Floods, Drought, Conflicts over water, Dams-benefits and problems.
(c) **Mineral resources:** Use and exploitation, Environmental effects of extracting and using mineral resources.
(d) **Food resources:** World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
(e) **Energy resources:** Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources.
(f) **Land resources:** Land as a resource, Land degradation, Man induced landslides, Soil erosion and desertification.

Unit – 2: Ecosystems (09 Lectures)

2.1. Concept, Structure and function of an ecosystem.
2.2. Producers, Consumers and decomposers, energy flow in the ecosystem.
2.3. Food chains, food webs, ecological pyramids
2.4. Ecological succession
2.5. Introduction, types, characteristic features, structure and function of the following ecosystem:
   (a) Forest ecosystem
   (b) Grassland ecosystem
   (c) Desert ecosystem
   (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Field work – Visit Report / Project Report (Field work equal to 5 lecture hours)

1. Visit to a local area to document environmental assets river / forest / grassland / hill / mountain etc.
2. Study of simple ecosystems-pond, river, hill slopes, etc.
3. Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
4. Study of common plants, insects, birds, animals etc.

Semester – II (Unit – 3 to 5)

Unit – 3: Biodiversity and its Conservation (08 Lectures)

3.1. Introduction – Definition: genetic, species and ecosystem diversity, value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
3.2. Biodiversity at global, National and local levels, Biogeographical classification of India, India as a mega-diversity nation
3.3. Hot-sports of biodiversity
3.4. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India
3.5. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Unit – 4: Environmental Pollution & Human Population (12 Lectures)

4.1. Definition, Cause, effects and control measures of :
   (a) Air pollution
   (b) Water pollution
   (c) Soil pollution
   (d) Marine pollution
   (e) Noise pollution
   (f) Thermal pollution
   (g) Nuclear hazards
4.2. Solid waste Management: Causes, effects and control measures of urban and industrial wastes, role of an individual in prevention of pollution, Pollution case studies, Disaster management: floods, earthquake, cyclone and landslides.

4.3. Population growth, variation among nations, Population explosion – Family Welfare Programme.

4.4. Human Rights & Value Education, HIV/AIDS, Women and child Welfare.

Unit – 5: Social Issues and the Environment (06 Lectures)

5.1. Environmental ethics: Issues and possible solution

5.2. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies, Wasteland reclamation, Consumerism and waste products.

5.3. Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness.

Text Book:

1. Bharucha, E. (2005). Textbook of Environmental Studies for undergraduate courses. Universities Press.

Reference Books:

1. Agarwal, K. C. (2001). Environmental Biology, Nidi Publ. Ltd. Bikaner
2. Bharucha, E. (2002). The Biodiversity of India (Vol. 1.). Mapin Publishing Pvt. Ltd.
3. Encyclopedia, E. (1991). Jaico Publishing House.
4. Hawksworth, D.L., Kalin-Arroyo, M. T., Heywood, V. H., & Watson, R. T. (1995). Global biodiversity assessment. Cambridge University Press.
5. Jadhav, H. V. (2006). Environmental Protection and laws. Himalaya publishing house.
6. Miller, G. T. (1993). Environmental science: sustaining the earth. In Wadsworth biology Series. Wadsworth Publishing Company.

Shri Manibhai Virani and Smt. Navalben Virani Science College (Autonomous), Rajkot

Part – III Ability Enhancement Compulsory Course – I

Environmental Science

Revised Evaluation Norms

For UG Student admitted from 2019-20 & onwards

The components and distribution of marks be as indicated below.

Semester - I				
S.N.	**Component**	**Content**	**Specification**	**Total Marks**
1.	Assignment (I/II)	Unit – I & II	Any One	10
2.	Test - 1		Test Duration 1.5hr	30
3.	Activity	-	Marks will be given at the end of semester II	-
			Total Marks Sem. - I	**40**

Semester - II					
S.N.	**Component**	**Content**	**Specification**		**Total Marks**
1.	Assignment – (I/II)	03 Units (Unit – III, IV, V)	Any One		10
2.	Test - 2		Test Duration 1.5hr		30
3.	Activity	-	Attendance	03 Marks	20
			Participation	07 Marks	
			Report	10 Marks	
				Total Marks Sem. – II	**60**
				Total Marks	**100**

At the end of the year no marks are given, only remarks will be given as follows:

Range of Marks	Remarks
40 and above	Completed
39 and below	Not Completed

Note: In case of non completion of the course, student has to complete the course ensuing semester

Note:

- Test – 1 will be conducted with CIA Test-2 of Sem. – 1
- Test – 2will be conducted with CIA Test-2 of Sem. – 2

Shri Manibhai Virani and Smt. Navalben Virani Science College (Autonomous),Rajkot

Revised Syllabus of Environmental Science

For Student Admitted from A.Y. 2021-22 & Onwards

Department: **Biology**

Programme: **B.Sc.(Microbiology), B.Sc.(Biochemistry), B.Sc (Mathematics), B.Sc.(Chemistry)**

Course Code	Course Title (F)	Credits
-- AECC I: Environmental Science	**Natural Resources management and Sustainable Development**	**2 Credits** **(1 Credit/sem.)**

Course Description:

Environmental science is a course dedicated to understanding the interactions between earth's natural systems and the demands placed on them by the human population. This course - Natural Resources management and Sustainable Development examines the scientific principles behind natural phenomena and resource cycles, explores how we utilize these systems and our impact, and potential solutions for the resulting consequences of resource mismanagement and exploitation. The course includes elements of life science, physical science, and social science and focuses on breadth and interrelatedness of relevant current events. Concepts can be explored through inquiry based laboratory exercises, environmental health assessment techniques, student presentations and projects.

Course Purpose:

The course focuses comprehension of the concept of sustainability in an amalgamated way, including surrounding, socioeconomic aspects. This course explores the coming future and what transformation need in current. The basic idea of the environmental conservation is that progression towards a sustainable future depends on what creative interdisciplinary thinking you derived from society. We look to motivate creativity and combine passion with critical thinking skills in students who one day will be the citizens working to convert the world to more sustainable systems. And Enhance their own level to protect the Environment.

Course Outcomes: Upon completion of this course, the learner will be able to		
CO No.	**CO Statement**	**Blooms taxonomy Level (K_1 to K_6)**
CO_1	Understand the need to lead more sustainable lifestyle and the need to use resources moreequitably.	K2
CO_2	Understand Importance of ecosystems and energy flow in the nature.	K2
CO_3	Understand and evaluate the global scale of environmental pollution and global issues	K1
CO_4	Understand the ethical, cross cultural, and historical context of global issues of Environment and the link between human and natural system.	K3
CO_5	Understand the transnational character of environmental problems and ways of addressingthem, including interactions across local to global scales.	K1, K3

Course Content	Hours
Semester I: Unit 1 & 2 Semester II : Unit 3 to 5	
Unit – 1: Basics of Environmental studies & Natural Resources	**9 hrs**
• Definition, scope and importance of Environmental studies. • Need for public awareness toward Environment and natural resources. • Renewable and non-renewable resources. • Concept of sustainable development. • Natural resources, associated problems and Role of an individual in conservation of naturalresources: (a) **Forest resources:** Use and over-exploitation, Deforestation,Timber extraction, Mining, Dams and their effects on forest and tribal people. (b) **Water resources:** Use and over-utilization of surface and ground water, Floods, Drought, Conflicts over water, Dams-benefits and problems. (c) **Mineral resources:** Use and exploitation, Environmental effects of extracting and using mineral resources. (d) **Food resources:** World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. (e) **Energy resources:** Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. (f) **Land resources:** Land as a resource, Land degradation, Man induced landslides, Soil erosion and desertification	
Unit – 2: Ecosystems	**9 hrs**
• Concept, Structure and function of an ecosystem. • Producers, Consumers and decomposers, energy flow in the ecosystem. • Food chains, food webs, ecological pyramids • Ecological succession • Introduction, types, characteristic features, structure and function of the following ecosystem: (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	

Unit – 3: Biodiversity and its Conservation	**8 hrs**
• Introduction – Definition: genetic, species and ecosystem diversity, value of biodiversity:consumptive use, productive use, social, ethical, aesthetic and option values. • Biodiversity at global, National and local levels, Biogeographical classification of India,India as a mega-diversity nation • Hot-sports of biodiversity • Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangeredand endemic species of India • Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity	
Unit – 4: Environmental Pollution & Human Population	**12 hrs**
• Definition, Cause, effects and control measures of : (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards (h) E-west. • Solid waste Management: Causes, effects and control measures of urban and industrial wastes, role of an individual in prevention of pollution, Pollution case studies, Disaster management: floods, earthquake, cyclone and landslides. • Human population growth – Human health. • Human Rights & Value Education, HIV/AIDS. • Women and child Welfare.	
Unit – 5: Global Issues and the Environment	**6 hrs**
• Environmental ethics: Issues and possible solution. • Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. • Environment Protection Acts (a) Air (Prevention and Control of Pollution) Act. (b) Water (Prevention and control of Pollution) Act. (c) Wildlife Protection Act. (d) Forest Conservation Act. (e) Issues involved in enforcement of environmental legislation. • Environmental movement (a) Chipko movement	

(b) Narmda Bachao Andolan • Environmental ethics and public awareness	

Text books :

- Bharucha Erach (2013), "Textbook of Environmental Studies for Undergraduate Courses", Universities Press (India) Private Ltd, Hyderabad
- Dave Deeksha & Kateva S.S., "Textbook of Environmental studies", Cengage Learning India Pvt. Ltd.

Reference books

- Agarwal, K. C. (2001). Environmental Biology, Nidi Publ. Ltd. Bikaner
- Bharucha, E. (2002). The Biodiversity of India (Vol. 1.). Mapin Publishing Pvt. Ltd.
- Encyclopedia, E. (1991). Jaico Publishing House.
- Hawksworth, D.L., Kalin-Arroyo, M. T., Heywood, V. H., & Watson, R. T. (1995). Globalbiodiversity assessment. Cambridge University Press.
- Jadhav, H. V. (2006). Environmental Protection and laws. Himalaya publishing house.
- Miller, G. T. (1993). Environmental science: sustaining the earth. In Wadsworth biologySeries. Wadsworth Publishing Company.

Pedagogic tools:

- Chalk and Board
- Power point presentation
- Seminar
- Videos
- By field visit
- e-learning
- By poster making
- Expert talk

Methods of Assessment & Tools:

Components of CIA: 100 marks

The components and distribution of marks be as indicated below.

Semester - I				
S.N.	**Component**	**Content**	**Specification**	**Total Marks**
1.	Assignment (I/II)	Unit – I & II	Any One	10
2.	Test - 1		Test Duration 1.5hr	30
3.	Activity	-	Marks will be given at the end of semester II	-
			Total Marks Sem. - I	**40**

Semester - II					
S.N.	**Component**	**Content**	**Specification**		**Total Marks**
1.	Assignment – (I/II)	03 Units (Unit – III, IV, V)	Any One		10
2.	Test - 2		Test Duration 1.5hr		30
3.	Activity	-	Attendance	03 Marks	20
			Participation	07 Marks	
			Report	10 Marks	
				Total Marks Sem. – II	**60**
				Total Marks	**100**

At the end of the year no marks are given, only remarks will be given as follows:

Range of Marks	**Remarks**
40 and above	Completed
39 and below	Not Completed

Note: In case of non completion of the course, student has to complete the course ensuingsemester

Note:

- Test – 1 will be conducted with CIA Test-2 of Sem. – 1
- Test – 2will be conducted with CIA Test-2 of Sem. – 2

Field work – Visit Report / Project Report (Field work equal to 5 lecture hours)

1. Visit to a local area to document environmental assets river / forest / grassland / hill /mountain etc.
2. Study of simple ecosystems-pond, river, hill slopes, etc.
3. Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
4. Study of common plants, insects, birds, animals etc.

16UAECO01	National Service Scheme	200 Hrs	01 Credit

Semesters I, II, III & IV

ELIGIBILITY

Any undergraduate student can opt for the course.

DURATION OF THE COURSE

The course shall extend over a period of two years comprising of **four semesters** with two semesters in one academic year. Each semester normally consists of **5-6 theory lectures and 3 regular and 2 Special activities and one special camp only in fourth semester.**

STRUCTURE OF THE COURSE

The NSS course shall have a curriculum comprising theory and activities with a specified syllabus. The curriculum of course is a blend of theory topics and activities as regular and special. In addition, one special camp is compulsory in the IV semester.

OBJECTIVES OF THE COURSE

1. To kindle the student's social consciousness
2. To offer opportunities
   - i) to work with and among people
   - ii) to develop awareness and knowledge of social realities
   - iii) to engage themselves in creative and constructive social work
   - iv) to gain skills in the exercise of leadership.
   - v) to enrich their personality

SCHEME OF INSTRUCTION AND EXAMINATIONS

Course code	Course	Total Hrs	Maximum Marks			Total credit
			CIE	CEE	Total	
16UAECO01	**NSS: Break up** ***First & Second Semester*** Theory Regular activities Special activities ***Third & Fourth Semester*** Theory Regular activities Special activities Special Camp	**40-50 Hrs** **Per semester** **(2 Years)**	**100**	**-**	**100**	**01 credit**

Semester –I

Theory Paper-1:

Introduction to NSS

1. NSS-History and Objectives & Aspects of NSS Programme
2. Emblem, flag, motto, song, symbol, badge etc.
3. Definition, profile of youth
4. Issues, challenges and opportunities for youth
5. Youth as an agent of social change
6. Concept of regular activities, special camping

Regular Activities :

1. Orientation Program-[NSS Song & various types of clapping]
2. 15th August-Independence Day celebration and Enrollment
3. Festival celebrations
4. Visit eg. mentally challenged children's school
5. Charity programme-[Before Diwali vacation]
6. 24th Sept.-NSS Day Celebrations

Special Activities :

1. Tree plantation
2. 6th August- Anti Atomic/Hiroshima Day
3. 2nd October-Gandhi Jayanti
4. 14th November-Children's Day
5. Notice Board activity for auspicious days –July to December-Date and its significance

Semester –II

Theory Paper-2:

Leadership & Youth Development

1. Meaning and types of leadership
2. Qualities of good leaders
3. Traits of leadership
4. Importance and role of youth leadership
5. National Youth Policy
6. Youth Development Programmes at national level, State level and Voluntary sector

Regular Activities

1. Visit to old age Home
2. New Year celebration
3. Charity Programme
4. 26th January-Republic day
5. Health Awareness

Special Activities

1. Presentation on Indian National leaders
2. HIV Awareness
3. Small skits on leadership
4. Notice Board activity for auspicious days –January to June- Date and its significance

Semester –III

Theory Paper-3:

Family, Community and Society

1. Individual as an entity
2. Individual as a member of a family
3. Individual as a member of a community and
4. Individual as a member of a society.
5. Role of individual to safeguard nature
6. Rights & Responsibilities as citizen of India

Regular Activities

1. 2nd October-Swatch Bharat initiative
2. 15th August –One item to be presented
3. Festival celebrations
4. Activity where Family is involved
5. Activity where Society is involved

Special Activities

1. 24th Sept. NSS Day celebration
2. Balanced Diet
3. Organization of HIV Awareness
4. Notice Board activity for auspicious days –January to June- Date and its significance

Semester –IV

Theory Paper-4:

General Health Awareness

1. Definition, needs and scope of health education
2. Healthy Lifestyles
3. First Aid
4. Programmes associated with safety
5. Yoga as a tool for healthy lifestyle
6. Safe drinking water, water borne diseases and sanitation

Regular Activities

1. Preparation of any item of safety importance
2. 26th January –One item to be presented
3. New Year Celebrations
4. Health Awareness
5. Yoga practice

Special Activities

1. Health Awareness
2. Flag Day Celebrations
3. Interaction with juniors
4. Notice Board activity for auspicious days –January to June- Date and its significance

Special Camp compulsory for all the NSS Cadets

GUIDELINES FOR THE COURSE

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme co-ordinator and the Principal will be allowed to compensate in the next year.
2. The evaluation shall comprise of Continuous Internal Evaluation (CIE) for activities and two tests in the two years, one at end of each year for Paper 1&2 and Paper 3 &4 respectively.
3. Participation is compulsory in special camp in fourth semester.
4. Degree will be awarded only after receiving of the certificate.
5. Additional award will be given on being selected for national level activities like RDC, YEP, NIC etc. and it will be considered equivalent to special activities for that semester.
6. In event of non-completion of course, the student has to re-do the course or opt for another one.

EVALUATION NORMS

Distribution of 100% CIE components:

S.No.	Component	Content	Marks	Sub Total
1.	**Attendance**	Min.80%	07	**07**
2.	**Activities***	Regular-12	24	**48**
		Special-8	24	
3.	**Compulsory**	Special Camp only in Sem. IV	10	**10**
4.	**Test-I**	Theory of First year	10 (Set for 20)	**30**
	CEE	Theory of Full Syllabus	20 (Set for 40)	
5.	**Special marks**	Participation at RDC-State level	03	**05**
		Participation at RDC-National level	04	
		Participation at NIC	04	
		Participation at YEP	05	
			TOTAL	**100**

***Sub components for each type of activity:**

S.No.	Component	Regular Activity	Special Activity	Special Camp
1.	Attendance	05	07	Compulsory
2.	Active Participation	05	08	10
3.	Responsibility	05	07	10
4.	Report writing	05	08	10
	(Total) Set for total	**(2) 20**	**(3) 30**	**(10)30**

- At the end of the course a separate certificate on completion of course will be issued by the CoE having only remarks as follows:

- **Remarks:**

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

19AECO01	National Service Scheme	200 Hrs	01 Credit

Semesters I, II, III & IV

ELIGIBILITY

Any undergraduate student can opt for the course.

DURATION OF THE COURSE

The course shall extend over a period of two years comprising of four semesters with two semesters in one academic year. Each semester normally consists of 5-6 theory lectures and minimum 3 regular and 2 Individual activities and one special camp only in fourth semester.

STRUCTURE OF THE COURSE

The NSS course shall have a curriculum comprising theory and activities with a specified syllabus. The curriculum of course is a blend of theory topics and activities as regular and individual. In addition one special camp is compulsory in the IV semester.

OBJECTIVES OF THE COURSE

1. To kindle the student's social consciousness
2. To offer opportunities
   - i) to work with and among people
   - ii) to develop awareness and knowledge of social realities
   - iii) to engage themselves in creative and constructive social work
   - iv) to gain skills in the exercise of leadership.
   - v) to enrich their personality

SCHEME OF INSTRUCTION AND EXAMINATIONS

Course code	Course	Total Hrs	Maximum Marks			Total credit
			CIA	CEE	Total	
19AECO01	**NSS: Break up** ***First & Second Semester*** Theory Regular activities Individual activities ***Third & Fourth Semester*** Theory Regular activities Individual activities **Special Camp**	**40-50 Hrs** **Per semester** **(2 Years)**	**100**	**-**	**100**	**01 credit**

Semester –I

Theory Paper-1:

Introduction to NSS

1. NSS-History and Objectives & Aspects of NSS Programme
2. Emblem, flag, motto, song, symbol, badge etc.
3. Definition, profile of youth
4. Issues, challenges and opportunities for youth
5. Youth as an agent of social change
6. Concept of regular activities, special camping

Regular Activities :
Due to Covid-19 pandemic situation we shall have some modifications …

1. Activity 1: Orientation Program-NSS Song & various types of clapping
2. Activity 2 : 15th August-Independence Day celebration and Enrollment /**26th January**
3. (Festival celebrations)-
   Activity 3: Reason for celebrating various festivals from June to December.
4. (Visit eg. mentally challenged children's school)-
   Activity 4 : Report writing of various activities done in various social organizations in Rajkot (any 2).
5. Activity 5 : Charity programme
6. Activity 6 : 24th Sept.-NSS Day Celebrations in sem III with your juniors.

Submit by end of January 2021.

Individual Activities :

1. Tree plantation – Plant a tree in your society and look after it. (If possible)
2. 6th August- Anti Atomic/Hiroshima Day – One Page write Up
3. 2nd October-Gandhi Jayanti – Teachings from Gandhiji's life to imbibe in my life.
4. 14th November-Children's Day-
5. Notice Board activity for auspicious days –July to December-Date and its significance

Make a list of auspicious days (national and international importance)
–July to December-Date and its significance

Keep ready by end of January 2021. (I will let you know later how to submit)

Reference Books:

1. NSS Manual
2. **Army NCC Cadet Handbook Specialised Subject SD/SW**

Semester –II

Theory Paper-2:

Leadership & Youth Development

1. Meaning and types of leadership
2. Qualities of good leaders
3. Traits of leadership
4. Importance and role of youth leadership
5. National Youth Policy
6. Youth Development Programmes at national level, State level and Voluntary sector

Regular Activities

1. Visit to old age Home
2. New Year celebration
3. Charity Programme
4. 26th January-Republic day
5. Health Awareness

Individual Activities

1. Presentation on Indian National leaders
2. HIV Awareness
3. Small skits on leadership
4. Notice Board activity for auspicious days –January to June- Date and its significance

Reference Books:

1. Seemiller, C. (2013). *The student leadership competencies guidebook: Designing intentional leadership learning and development*. John Wiley & Sons.
2. Shankman, M. L., & Allen, S. J. (2010). *Emotionally intelligent leadership for students: facilitation and activity guide*. John Wiley & Sons.
3. Covey, S. R. (2004). *The 7 habits of highly effective people: Powerful lessons in personal change*. Simon and Schuster.
4. **Army NCC Cadet Handbook Specialised Subject SD/SW**

Semester –III

Theory Paper-3:

Family, Community and Society

1. Individual as an entity
2. Individual as a member of a family
3. Individual as a member of a community and
4. Individual as a member of a society.
5. Role of individual to safeguard nature
6. Rights & Responsibilities as citizen of India

Regular Activities

1. 2nd October-Swatch Bharat initiative
2. 15th August –One item to be presented
3. Festival celebrations
4. Activity where Family is involved
5. Activity where Society is involved

Individual Activities

1. 24th Sept. NSS Day celebration
2. Balanced Diet
3. Organization of HIV Awareness
4. Notice Board activity for auspicious days –January to June- Date and its significance

Reference Books:

1. Gaur R.R, Sangal R. and Bagaria G.P. *Universal Human values & professional Ethics.* Excel Books.

Semester –IV

Theory Paper-4:

General Health Awareness

1. Hygeine and sanitation
2. Healthy Lifestyles
3. First Aid
4. Basics of Home Nursing
5. Yoga as a tool for healthy lifestyle
6. Safe drinking water, water borne diseases and sanitation

Regular Activities

1. Preparation of any item of safety importance
2. 26th January –One item to be presented
3. New Year Celebrations
4. Health Awareness
5. Yoga practice

Individual Activities

1. Health Awareness
2. Flag Day Celebrations
3. Interaction with juniors
4. Notice Board activity for auspicious days –January to June- Date and its significance

Reference Book : Army NCC Cadet Handbook Specialised Subject SD/SW

Special Camp compulsory for all the NSS Cadets

GUIDELINES FOR THE COURSE

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of Programme co-ordinator and the Principal will be allowed to compensate in the next year.
2. The evaluation shall comprise of Continuous Internal Assessment (CIA) for activities and two tests in the two years, one at end of each year for Paper 1&2 and Paper 3 &4 respectively.
3. Participation is compulsory in special camp in fourth semester.
4. Degree will be awarded only after receiving of the certificate.
5. National level activities like RDC, YEP, NIC etc. will be considered equivalent to individual activities for that semester.
6. In event of non-completion of course, the student has to re-do the course or opt for another one.

EVALUATION NORMS

Distribution of 100% CIA components:

S.No.	Component	Content (No.)	Marks	Sub Total
1.	**Attendance**	Min.80%	10	**10**
2.	**Activities***	Regular Activity -12	24	**48**
		Individual Activity -8	24	
3.	**Compulsory**	Special Camp only in Sem. IV	10	**12**
4.	**Test-I**	Theory of First year	10 (Set for 20)	**30**
	CEE	Theory of Full Syllabus	20 (Set for 40)	
			TOTAL	**100**

***Sub components for each type of activity:**

S.No.	Component	Regular Activity	Individual Activity or Participation	Special Camp
1.	Attendance	01	01	Compulsory
2.	Active Participation	01	03	10
3.	Responsibility	02	03	12
4.	Report in soft copy with photographs	05	08	14
	(Total) Set for total	**(2) 10**	**(3) 15**	**(12)36**

- At the end of the course a separate certificate on completion of course will be issued by the CoE having only remarks as follows:

- **Remarks:**

Range of % Marks	Remarks
90-100	Excellent
75-89	Very Good
60-74	Good
40-59	Fair
39- and below	Not Completed

Shree Manibhai Virani and Smt. Navalben Virani Science College, Rajkot
(Autonomous)
Affiliated to Saurashtra University, Rajkot

For Students Admitted From A.Y.2021-2022 and Onwards

Department: NSS **Co-Curricular Course**

Semester – I		
Course Code	**Course Title**	**Credits**
21AECO01	**National Service Scheme (200 Hrs)**	**1**
	Semesters I, II, III & IV	

Course Description:

The NSS course shall have a curriculum comprising theory and activities with a specified syllabus. The curriculum of course is a blend of theory topics and activities as regular and individual. The course shall extend over a period of two years comprising of four semesters with two semesters in one academic year. Each semester normally consists of 5-6 theory lectures and minimum 3 regular and 2 Individual activities and one special camp is compulsory only in fourth semester.

Course Purpose:

New generation of students are increasingly unaware of local rural realities surrounding their Higher Education Institutions, as rapid urbanisation has been occurring in India. A large percentage of Indian population continues to live and work in rural and peri-urban areas of the country. By doing various activities they will engage themselves in creative and constructive social work and gain skills in the exercise of leadership to enrich their personality. Such a course will enable students to learn about rural challenges and develop understanding of rural wisdom and life-style in a respectful manner.

Course Outcomes: Upon completion of this course, the learner will be able to

CO No.	**CO Statement**	**Blooms taxonomy Level (K_1 to K_6)**
CO_1	Gain an understanding of rural life, culture and social realities.	K2
CO_2	Develop a sense of empathy and bonds of mutuality with local community, society and nature.	K2
CO_3	Appreciate significant contributions of local communities to Indian society and Economy and practice leadership quality.	K3

CO_4	Learn to value the local knowledge and wisdom of the community and society.	K2
CO_5	Identify opportunities for contributing to community's socio-economic, health and hygiene Improvements.	K2

Course Content	**Hours**
Divided into four Modules, and activities are part of each module. One module for each semester.	
Module-I : Introduction to NSS	8
1. NSS-History and Objectives & Aspects of NSS Programme 2. Emblem, flag, motto, song, symbol, badge etc. 3. Definition, profile of youth 4. Issues, challenges and opportunities for youth 5. Youth as an agent of social change 6. Concept of regular activities, special camping	
Module-II: Leadership & Youth Development	**8**
1. Meaning and types of leadership 2. Qualities of good leaders 3. Traits of leadership 4. Importance and role of youth leadership 5. National Youth Policy 6. Youth Development Programmes at national level, State level and Voluntary sector	
Module III: Family, Community and Society	**8**
1. **I**ndividual as an entity 2. Individual as a member of a family 3. Individual as a member of a community and 4. Individual as a member of a society. 5. Role of individual to safeguard nature 6. Rights & Responsibilities as citizen of India	
Module IV: General Health Awareness	**8**
1. Hygiene and sanitation 2. Healthy Lifestyles 3. First Aid 4. Basics of Home Nursing 5. Yoga as a tool for healthy lifestyle 6. Safe drinking water, water borne diseases and sanitation	

Sr No	List of All Activities	Hrs
1	Orientation Program-NSS Song & various types of clapping	2
2	National Days-Celebration -15th August- & 26th January	2
3	Festival celebrations, New Year celebrations	2
4	Visit to various places eg. mentally challenged children's school, old age Home	2
5	Charity programme	2
6	24th Sept.-NSS Day Celebrations with juniors.	2
7	Tree plantation ,	3
8	Various Days Celebrations with significance Eg 6th August- Anti Atomic/Hiroshima Day,14th November-Children's Day, 7th Dec. Flag Day Celebrations	1
9	2nd October-Gandhi Jayanti-Swachh Bharat Abhiyan	3
10	Health Awareness , HIV Awareness	3
11	Notice Board activity for auspicious days –and its significance	2
12	Presentation on Indian National leaders	
13	Small skits on leadership	3
14	Activity where Family is involved	2
15	Activity where Society is involved	2
16	Interaction with juniors	2
17	Balanced Diet, Yoga practice	3
18	Various Awareness Programs	
19	Special Activity at district and state level	
20	Special Camp compulsory for all the NSS Cadets	7 days

Text Books:

1. **NSS Manual**
2. **Army NCC Cadet Handbook Specialised Subject SD/SW**
3. **Gaur R.R, Sangal R. and Bagaria G.P. *Universal Human values & professional Ethics.* Excel Books.**
4. **Public Health and Hygiene- Saras Publication**

Reference Books:

1. Seemiller, C. (2013). The student leadership competencies guidebook: Designing intentional

leadership learning and development. John Wiley & Sons.
2. Shankman, M. L., & Allen, S. J. (2010). Emotionally intelligent leadership for students: facilitation and activity guide. John Wiley & Sons.
3. Covey, S. R. (2004). The 7 habits of highly effective people: Powerful lessons in personal change. Simon and Schuster.
4. General Hygiene and preventive medicine: A text book for college students,medical students, nurses, public health workers and social workers.--by John Weinzirl (Author), Publisher : Lea & Febiger

Pedagogic tools:

- Chalk and Board
- Power Point Presentation
- Videos
- Handouts
- Field visit
- Activities

Methods of Assessment & Tools:

Components of CIE: **100** marks

Sr. No.	**Component**	**Content**	**Duration (if any)**	**Marks**	**Sub Total**
A	Attendance		All 4 Semesters	10	10
B	Test 1	Sem I & Sem II	2 hours	10 (Set for 20)	10
	Test 2	All 4 Semesters	2 hours	20 (Set for 40)	20
	NSS Register	All 4 Semesters	-	10	10
C	Activities	Group-20 Individual-20	-	20+20	40
D	Special Camp	Sem IV	-	10	10
Grand Total					**100**
B: NSS Register and written Test **C :** Activities- Active Participation, Responsibility and report Writing					

Methods of Assessment & Tools: some changes in Assessment due to covid

Components of CIE: **100** marks

Sr. No.	Component	Content	Duration (if any)	Marks	Sub Total
A	Attendance		All 4 Semesters	10	10
B	Test 1	Sem I & Sem II	2 hours	20 (Set for 20)	20
	Test 2	All 4 Semesters	2 hours	20 (Set for 40)	20
	NSS Register	All 4 Semesters	-	10	10
C	Activities	Group-20 Individual-10	-	20+10	30
D	Special Camp	Sem IV	-	10	10
Grand Total					**100**
B: NSS Register and written Test **C :** Activities- Active Participation, Responsibility and report Writing					

- **At the end of the course a separate certificate on completion of course will be issued by the CoE having only remarks as follows:**
-

Letter Grade	Grade Point
O (Outstanding)	10
A+(Excellent)	9
A (Very Good)	8
B+(Good)	7
B (Above average)	6
C (Average) 5	5
P (Pass) 4	4
F (Fail) 0	0
Ab (Absent)	0

-

Department: **NCC**

Semester – I		
Course Code	**Course Title**	**Credits**
19AECO02	National Cadets Corps (NCC)	**1**

ELIGIBILITY:

Any under graduate student can opt for the course with following eligibility.

- ✓ Age should be 15 to 25 year.
- ✓ Candidate must be medically fit.

DURATION OF THE COURSE

- ✓ The course shall extend over a period of two years comprising of four semesters with two semesters in one academic year. Each semester normally consists of 45 theory & practical lectures as regular institutional training and 5 Special activities.

ENROLMENT

- ✓ Candidate get enrolled on voluntary basis
- ✓ If no of candidate is found more than available vacancies, there would be a selection.
- ✓ A certificate holder, instrument player, state and national level sports person would be given priority.

Course Description:

This course reinforces the basic understanding of armed force. NCC stands for the National Cadet Corps, which works towards the empowerment of the nation's youth. The course encourages the aspirants into several productive activities that keep them away from any unconstructive forces. The interested candidates get a chance to get military training after completion of the NCC Course successfully. Here, you will get details about the eligibility criteria, fee structure, colleges, job profile, and the average salary that you can expect after completing the NCC Course.

Course Purpose:

To Provide a Suitable Environment to Motivate the Youth to Take Up a Career in the Armed Forces. To Develop Character, Comradeship, Discipline, Leadership, Secular Outlook, Spirit of Adventure, and Ideals of Selfless Service amongst the Youth of the Country.

Course Outcomes: Upon completion of this course, the learner will be able to

CO No.	CO Statement	Blooms taxonomy Level (K_1 to K_6)
CO_1	To understanding the aim of NCC	K2

CO_2	Development of Personality	K2
CO_3	Grooming and develop creativity in youth	K3
CO_4	Enhancement of Understanding power towards armed force	K2
CO_5	Understanding the knowledge of Drill and importance of drill.	K2

Course Content	**Hours**
Module-I : NCC Common Subject Level-I	**9**
• The NCC • Foot Drill-1 Social Awareness & Community Development-1	
Module-II: Social Awareness & Community Development	**9**
Social Awareness & Community Development-1 Social Awareness & Community Development-2	
Module III: 4. Environment awareness and conservation	**8**
• Environment awareness and conservation-1 • Environment awareness and conservation-2	
Module IV: 5. Health & Hygiene	**8**
• Health & Hygiene-1 • Health & Hygiene-2	
Module V: NCC Special Subject Level-I	**10**
• Armed Forces • Military History **Personality Development Level –I** Introduction to personality Development Factors influencing /shaping personality :Physical ,social ,psychological & Philosophical	

MANDATORY SOCIAL ACTIVITY:

1. 15 August: Independence Day
2. Cleanliness drive
3. NCC day

Text books :

- Hand book of NCC

Reference books:

NCC book by R K Gupta

Pedagogic tools:

- Chalk and Board
- Power Point Presentation
- Videos
- Handouts

Methods of Assessment & Tools:

Components of CIE: **30** marks

Sr. No.	Component	Content	Duration (if any)	Marks	Sub Total
A	Test 1	1st 2 units	$1^{1/2}$ hours	5 (Set for 30)	5
	Test 2	All 5 units	3 hours	15 (Set for 60)	15
B	Assignment 1	1st 2 units	-	20	5
C	Assignment 2	3,4,&5	-	20	5
Grand Total					**30**
Assignment	• Student handouts				
Class activity	• Quiz • Unit test				

GUIDELINES FOR THE PROGRAMME

1. Minimum 80% attendance is required, if not able to fulfil it then only by the permission of NCC Officer and the principal will be allowed to compensate in the next year.
2. Degree will be awarded only after receiving of the certificate.
3. Additional award will be given on being selected for national level activities like RDC, TSC, National Games, YEP, NIC etc.
4. Institutional training theory Syllabus is as prescribed by DG NCC and training plan by DG NCC, New Delhi.
5. During Sem –I & II (1st Year Of Training) cadet need to be attend_ 15 parade (each parade is of 3 period of 40 minutes so, 45 periods including practical).
6. During Sem III or Sem IV (2nd Year Of Training)cadet need to be attend 18 parade (1 parade = 3 period of 40 minutes so, 54 periods including practical)&One Annual Training Camp is compulsory (being eligible for B Certi exam).
7. Mandatory special activities are compulsory during each semester as per syllabus.(Special case of absence considered only when the cadet found in severe medical problem during the activities).
8. Successfully completion of one training year and one theory and practical exam in the month of February/march.
9. The evaluation shall comprise of Continuous Internal Evaluation (CIE) for regular institutional training 10 special activities in each year.

10. 80 % attendance will be minimum required for getting the certificate.
11. Participation is compulsory in special camp in second year.

Co-ordinator,
Criterion Incharge Dr Sanal Shah
Shri Manibhai Virani & Smt. Navalben
Virani Science College, Rajkot

Shree Manibhai Virani & Smt. Navalben Virani Science College * Rajkot *
Autonomous College "A" grade by NAAC "STAR" College by MST-DBT

Principal
Shri Manibhai Virani and
Smt. Navalben Virani Science College
(Autonomous) Rajkot.