MVP. Samaj's

K.G.D. M. Arts Commerce and Science College, Niphad .

Department Of Chemistry

Courses that include experiential learning through project work/field work/internship

1. S.Y.B.Sc. Chemistry Syllabus

UNIVERSITY OF PUNE

REVISED SYLLABUS FOR S.Y. B.Sc. CHEMISTRY FROM 2014-2015

(According to Semester system 2014-2015)

Course structure: There will be four theory papers of 50 Marks each, (40 marks external + 10 marks internal) and one practical course of 100 marks. (80 marks External + 20 marks Internal). The examination will be held semester-wise for theory papers whereas the examination for practical course CH-223 will be held at the end of **SEMETER-II**

SEMESTER	PAPER	COURSE TITLE	MARKS
I	CH-211	PHYSICAL & ANALYTICAL CHEMISTRY	50
I	CH-212	ORGANIC & INORGANIC CHEMISTRY	50
II	CH-221	PHYSICAL & ANALYTICAL CHEMISTRY	50
II	CH-222	ORGANIC & INORGANIC CHEMISTRY	50

Practical Course in Chemistry: CH-223 - 100 Marks

Equivalence of Previous Syllabus:

Semester	Old Course (2009-10)	New Course (2014-15)
I	CH-211 : Physical Chemistry	CH-211 : Physical & Analytical Chemistry
I	CH-212 : Organic Chemistry	CH-212 : Organic & Inorganic Chemistry
II	CH-221 : Inorganic Chemistry	CH-222 : Organic & Inorganic Chemistry
II	CH-222 : Analytical Chemistry	CH-221 : Physical & Analytical Chemistry
	CH- 223: Practical	CH- 223: Practical

Practical Course in Chemistry CH – 223

A) Physical Chemistry practicals (Any Five)

i. To determine critical solution temperature of phenol water system

ii. To determine molecular weight of given organic liquid by steam distillation

iii. Determination of solubility of benzoic acid at different temperature and to determine ΔH of dissociation process.

iv. To study neutralization of acid (HCl) base (NaOH) and CH_3COOH by NaOH and H_2SO_4 by NaOH.

v. To determine the rate constant (or to study kinetics) of acid catalyzed ester hydrolysis.

vi. To determine the rate constant of base catalyzed ester hydrolysis.

vii. Partition coefficient of iodine between water and carbon tetrachloride.

Aim: To equip students to correlate theoretical and experimental knowledge

Objectives: After completion of practical course student should be able to

i. Verify theoretical principles experimentally

ii. Interpret the experimental data

iii. Improve analytical skills

iv. Correlate the theory and experiments and understand their importance

B) Inorganic Qualitative Analysis (Minimum Five mixtures)

i. One simple mixture (without phosphate or borate)

ii. Two Mixtures containing PO_4^{3-} (With PO_4^{3-} removal)

iii. Two Mixtures containing BO_3^{3-} (With BO_3^{3-} removal)

Inorganic Qualitative Analysis of Binary Mixtures (including phosphate and borate removal).

Sodium carbonate extract is to be used wherever necessary for detecting acidic radicals.

C) Organic Chemistry Practical

a. Organic qualitative analysis of Binary Mixtures without ether separation **(Four only)**

Two: solid-solid, one: solid-liquid, one: liquid-liquid

b. Organic Preparation: **(Any two including Crystallization, MP, TLC)**

i) Pthalic anhydride to pthalamide

ii) Glucose to osazone

iii) Acetanilide to p-bromoactanilide

iv) Benzaldehyde to dibenzylidene acetone

After completion of practical course student should be able to –

i) Verify theoretical principles experimentally.

ii) Acquire skill of crystallisation, record correct m. p. / b. p.

iii) Perform the complete chemical analysis of the given organic compound and should be able to recognize the type of compound.

iv) Write balanced equation for all the reactions, they carry in the laboratory.

v) Perform the given organic preparation according to the given procedure.

vi) Follow the progress of the reaction by using TLC technique.

vii) Set up the apparatus properly for the given experiments.

viii) Perform all the activities in the laboratory with neatness and cleanness.

Ref. 1 Organic Qualitative Analysis: A. I. Vogel

D) Analytical Chemistry Practicals (Any Five)

i. Estimation of sodium carbonate content of washing soda.
(Vogel 5thEdition: 10.30 page 295).

ii. Determination of Ca in presence of Mg using EDTA.
Ref.2: Page 412

iii. a) Preparation of standard 0.05 N oxalic acid solution and standardization of approx. 0.05N $KMnO_4$ solution.
b) Determination of the strength of given H_2O_2 solution with standard 0.05 N $KMnO_4$solution.

iv. Estimation of Aspirin from a given tablet and find errors in quantitative analysis.

v. Estimation of Al (III) from the given aluminium salt solution by using Erichrome Black–T indicator (Back titration method)

vi. Iodometric estimation of copper.

vii. Report on one day industrial educational visit.

Reference books

1. Analytical Chemistry by G.D. Christian 6th edition.
2. Vogel's Textbook of Quantitative chemical analysis 6th edition R.C. Denney, J.D. Barnes, M.J.K. Thomas

Aim: To equip students to correlate theoretical and experimental knowledge

Objectives: After completion of practical course student should be able to

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iii. Improve analytical skills

iv. Correlate the theory and experiments and understand their importance

N.B. - Industrial visit during the academic year is compulsory.

Principal
Karmaveer Ganpat Dada More
Arts,Commerce & Science College
Niphad Dist.Nashik.

2. Field Visit Report of the Department of Chemistry

M.V.P.Samaj`s

K.G.D.M. Art's, Commerce & Science College, Niphad (Nashik)

Department of Chemistry

Academic Year:- 2019-2020

A Report

On

"Study tour to IIT Bombay SAIF Department"

For B.Sc Chemistry Students

IIT BOMBAY

Indian Institute of Technology Bombay (IIT Bombay)

(Date-09/01/2020)

Head
Department of Chemistry
G.D.M. Arts, Commerce & Science College
Niphad, Dist. Nashik

Karmveer Ganpat Dada More Arts, Comm. & Sci. College Niphad Nashik

Principal
Karmveer Ganpat Dada More
Arts, Commerce & Science College
Niphad, Tal.Niphad, Dist.Nashik

Preamble:

K.G.D.M. Art's, Commerce & Science College, Niphad (Nashik) organized a one day Educational Tour to Indian Institute of Technology Bombay (IIT Bombay) on 09/01/2020 to for B.Sc Chemistry students. The visit was organized with the prior permission (IIT Saif department) Teacher specially Prof. B. B. Muntode, Prof. Y. D. Kadlag, Prof. S. S. Kushare, Smt. B. L. Ugale and Smt. P.A. Shinde have taken hard efforts and initiative under the continuous guidance of our Principal Dr. R. N. Bhavare, and Tour in-charge Prof. S. S. Kushare, which made this visit a grand success. Total 45 students along with 4 faculty member and 1 non- teaching assistant Mr. N.B. Dhomase have joined this study visit.

Objective:

1) To acquire basic knowledge and functioning of sophisticated analytical instrument.
2) To give students an opportunity to relate the classroom learning to the real world situation.
3) The student will learn the laboratory skills needed to design, safely conduct and interpret chemical research.
4) The student will understand the importance of the analytical instruments, how it works and its role in chemical research.
5) Acquire an ability to think scientifically, independently and to make rational discussion.
6) Develop an appreciation of chemistry and its application in daily life.
7) To teach students to analyze data from experiments or from other sources
8) To provide students with some insight into future career prospect in the fields related to Chemistry.

Detail report:

M.V.P.Samaj`s K.G.D.M. Art's, Commerce & Science College, Niphad department of chemistry organised one day study tour for B.Sc Chemistry students on 9th January 2020. Study tour organised at Indian Institute of Technology Bombay (IIT Bombay), Department of Sophisticated analytical instrument facility and Centre for research in Nano-technology and Science. Visit starts from Niphad at Thursday 05.00 am and reached to Indian Institute of Technology Bombay (IIT Bombay) at 10.15 am. First we visit to IIT campus and take tea and snacks, after this we start the visit to Sophisticated analytical instrument facility department and visit one by one to different sophisticated instruments. Technical assistants of every sophisticated instrument give us information about principle, working and applications of sophisticated instruments.

During the visit we observe following instruments:

Research Area Wise Facilities available at SAIF Centres.

Elemental Analysis:

1) CHNSO Elemental Analyzer(CHNS)

2) ICP-Atomic Emission Spectrometer(ICP-AES)

3) ICP-Mass Spectrometry(ICP-MS)

Speciation/free radical analysis:

1) Electron Spin Resonance Spectrometer(ESR)

2) Nuclear Magnetic Resonance Spectrometer (NMR 600 MHz)

Electron Microscopes:

1) Environmental Scanning Electron Microscope (ESEM) (Central facility at CRNTS)

2) Field Emission Gun-Scanning Electron Microscopes(FEG-SEM)

3) Transmission Electron Microscope(TEM)

4) High resolution Transmission Electron Microscope 200 kV (HR-TEM 200 kV)(Central facility at CRNTS)

5) High Resolution-Transmission Electron Microscope 300 kV (HR-TEM)

Optical Spectroscopy:

1) FTIR-Imaging System (FTIR-IMG)

2) Laser Raman Spectroscopy (LRS) (Central facility at CRNTS)

3) Gas and Liquid Chromatography:

4) Gas Chromatograph With High Resolution Mass Spectrometer(GC-HRMS)

5) High Resolution Liquid Chromatography Mass Spectrometer (HR-LCMS)

6) High Resolution Liquid Chromatography Mass Spectrometer (HR-LCMS Orbitrap)

7) Liquid Chromatography Mass Spectrometer (LC-MS)

Other Instruments at SAIF/CRNTS:

1) Time-of-Flight Secondary Ion Mass Spectrometer (ToF SIMS)

2) Small Angle X-ray Scattering (SAXS).

Return to College:

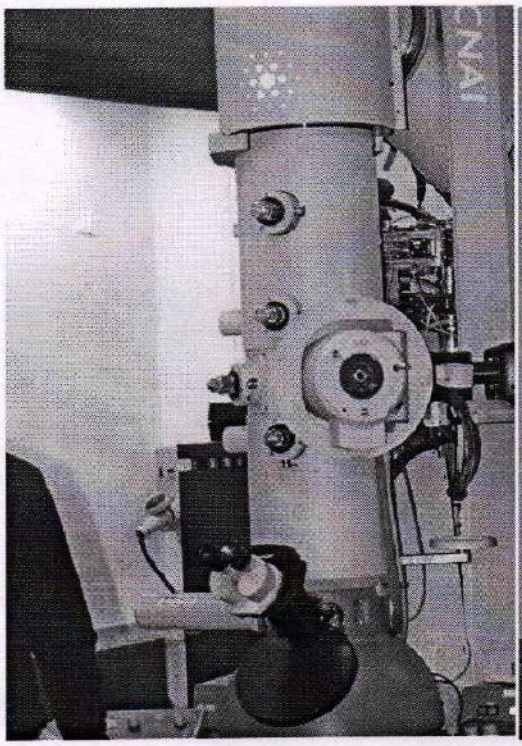
Return to college at the way visit the historical place in Mumbai at Gateway of India, Build in 1924 George Wittet had prepared a drawing of gateway way of india, which was built in the memory of the visit of king George Vth and Queen Mary to india in 1911. we reached at College on 09th January 2020 at 11.57 pm.

All faculty member and students are thankful to our Respected Principal Dr. R. N. Bhavare for granting the permission and valuable guidance for successful organising study tour.

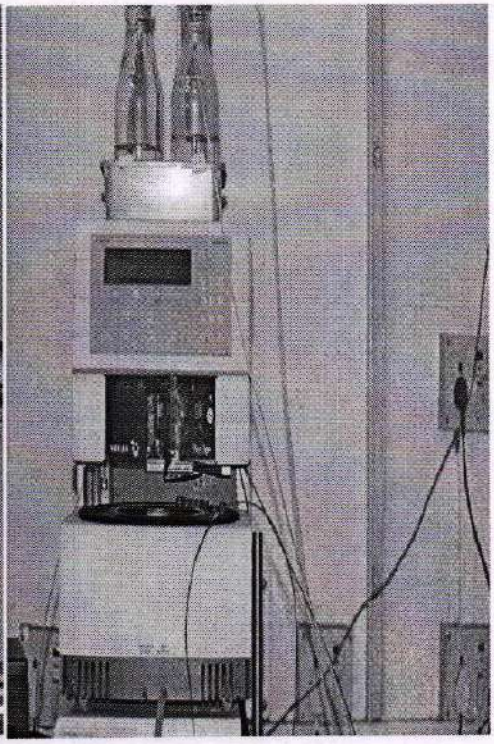
Head
Department of Chemistry
G.D.M. Arts, Commerce & Science College
Niphad, Dist. Nashik

Principal
Karmveer Ganpat Dada More
Arts, Commerce & Science College
Niphad, Tal.Niphad, Dist.Nashik

Photograph during Visit:



1) Transmission Electron Microscope (TEM)



2) HPLC instrument

3) Prof. B. B. Muntode with Technical assistant at SAIF IIT department.

4) Group Photo Teacher with students at SAIF Department IIT.

5) Group photo teacher with student at Gateway of India.

Head
Department of Chemistry
G.M. Arts, Commerce & Science Colle
Niphad, Dist. Nashik

Principal
Karmveer Ganpat Dada More
Arts, Commerce & Science College
Niphad, Tal.Niphad, Dist.Nashik

2. Representative Field Visit Report by Student

NAME - GAJARE MADHURI DNYANESHWAR

CLASS - T.Y.BSC

ROLL NO - 4

SEAT NO - 22701

VISIT REPORT

VISIT REPORT

Visit Repoat

CERTIFICATE

K. G. D. M. College Niphad

Depaatment of chemistay

This is ceatify that miss. Gajaae Madhuai Dnyaneshwaa of class T.Y. BSC. Roll NO - 4 [Exam seat NO - 22701] has satiesfactaaily complited that visit aepoat duaing academic yeaa 2019-2020

Paactical Inchaage

Examinea (Pnof. B. B. Mundade)

Head of depaatment.

Dept. of Chemistry
K.G.D.M. Arts, Commerce & Science College, Niphad

Savitaibai phule pune vniveasity and ova college chemistay depaatment of S.Y.BSC and T.Y.BSC aaaange on one day paogaamm of visit . IIt Bombay situated in pawai in which we aae visit sauf Depaatment [spo sophisticated Analytical instauement facility] we was visit SAIF au date of 9 JAN 2020 (Thuesday) we aae visited SAIF depaatment in oades to study diffeaent micaoscope spectaoscopy and chaomatogaaph techniques.

on 9th JaN 2020 eaaly moaning 8:30AM we was staated ova taua we was staated a Tauney taua with faua teaches and S.Y. BSc and T.Y.BSc student obout 45 . we aae visited and IIT bombay compus au about 10:30 am moaning we aae staated to collect infoamation about all the instauement theia wask . paecaution should be taken and application with the help of aespective teaches faa aespective instauement.

These aae many instauement available faa study, eaeay aeagaach oa paoffesoa gives the infoamation about the aespective instauemen some instauement we was studied theia waaks

construction waaking , application aae as follow

@ Electaospin aesonamse spectaometea.

Electaon spin aesonamse spectaocopy is based on the , absaption of micaowave aadiation by on unpaiaed electaon when it is exposed to staong magnetic fiteld


Rigaku

b] Nuclear magnetic Resonance spectrometer (NMR 600 MHz)

c] Environmental scanning electron microscope [Esem]

High vaccum mode a nows analysis of electrically conducting and non-conducting samples can be analysed after sputter low vaccum & ESEM modes allows analyse of ter biological and insulation sample with out coating. ESEM is also equipped with energy dispersive spectroscopy.

d] Field emision Gun-scanning electron microscope.

e] Transmission Electron microscope [TEM]

Application → ① material science | metallurgy
② biological science
③ Nanotechnology
④ Pharmaceuticals
⑤ semiconductor.

f] Laser Raman spectroscopy

g] Gase chromatograph with high resolution mass spectrometer.

h] high resolution liquid chromatograph

i] liquid chromatograph mass spectroscopy

j] small-angly X-ray scattering (SAXS)

k] Time of light secondary Ion-mass spectrometer.

Gas chromatography

All the above instruement we was studied upto 2pm. and after the all instruement Information collected we are going to lunch in contain of IIT bomboy we are finish lunch upto 3pm and going for next spot of our tour. that was Gate way of india and taken many of pics and selfies to collect memories of our tour we was taken group photos and selfies with all the girls and boys and Teachers. enjoy very well.

At about 6pm. we all the start our back Journey to Niphad. we are all reach Niphad at 12am this study tour is enjoyable and beutifull we are collect all information which is usefull for our P.G study. It was very happy and enjoyble visit that we will Never forget.