

SNJB (Jain Gurukul's)

**K.K.H. Abad Arts, S.M.G. Lodha Commerce & S.P.H. Jain Science College
Neminagar, Chandwad-423101, Dist.-Nashik, Maharashtra**



Establishment
27/11/1928

(Affiliated to SavitribaiPhule Pune University) Id. No.PU/NS/AC/015/1970

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• P. O. Box No.: 6 • E-mail : alccchandwad@yahoo.co.in

• Website : www.acschandwadcollege.com

DST-FIST Funded (2018-19)

UGC-NSQF Courses (B.Voc. & CC)

Best College Award by SavitribaiPhule Pune University (2015-16)

1.3.2: Number of courses that include experiential learning through project work/field work/internship during the year

M.Sc. I. Organic Chemistry - Project/OJT

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Savitribai Phule Pune University

(Formerly University of Pune)



Post-Graduate Program in Chemistry

(Faculty of Science and Technology)

New Syllabi (As Per National Education Policy-2020) for

M.Sc. (Chemistry) Part-I

(Physical Chemistry, Inorganic Chemistry and Analytical Chemistry)

(For Colleges Affiliated to Savitribai Phule Pune University)

To be implemented with effect from Academic Year 2023-2024

1. Preamble:

The global education development agenda reflected in the Goal 4 (SDG4) of the 2030 Agenda for Sustainable Development, adopted by India in 2015 - seeks to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”. Such a towering goal will require the entire education system to be redesigned to support and foster learning, so that all of the critical targets for Sustainable Development can be achieved. National Education Policy 2020 is the first education policy of the 21st century and aims to address the many growing developmental imperatives of our country. This Policy proposes the revision and revamping of all aspects of the education structure, including its regulation and governance, to create a new system that is aligned with the aspirational goals of 21st century education, including SDG4. The NEP 2020 is based on the principle that education must develop critical thinking and problem solving abilities along with social, ethical, and emotional capacities.

The M.Sc. Chemistry syllabi is revised as per the guidelines of UGC, Government of Maharashtra and Savitribai Phule Pune University, Pune. With NEP-2020 in background, the revised curricula will articulate the spirit of the policy by emphasizing upon- integrated approach to learning; innovative pedagogies and assessment strategies; multidisciplinary and Interdisciplinary education; creative and critical thinking; student-centric participatory learning; imaginative abilities and flexible curricular structures to enable creative combination of disciplines for the study. The M.Sc. Chemistry Programme will transmit advanced knowledge of chemical sciences along with its fundamentals. In this programme, students will be empowered with assignments in academia and industry to provide the skills and information necessary for creating employment. The Programme exposes students to significant advances in chemical sciences as well as related fields through multidisciplinary and interdisciplinary courses. The design of the syllabi is such a way that it addresses chemical safety, green chemistry principles and industrial skills. It is intended to bring out the best in each student's ability, to sharpen their scientific temper, and to keep them up to date on recent developments in the field.

The Aims of the programme are:

- a) To impart basic and advanced knowledge of chemical sciences among students.
- b) To provide adequate blend of theory, computation and hands-on experiments.
- c) To provide higher education, disciplinary and inter/multi-disciplinary research oriented knowledge to the students.

- d) To provide a learned, skilled and creative pool of graduates who are ready to take up challenging assignments in different kinds of chemical industries, research institutions and academia.
- e) To foster responsible, proactive individuals who are equipped with rational thinking and competencies to address local challenges.

The M.Sc. Chemistry course structure consists of a well-balanced mix of Major Core, Major Electives, Research oriented courses, On-Job training/Internship and Project based learning. Out of total of 88 credits, 18 credits have been allotted to Research methodology and Project based learning. For M.Sc. Chemistry Degree, a student has to earn the minimum 88 credits from their four semesters. If students complete 44 credits in PG first year, he/she can exit with PG Diploma or continue with PG second year. The M.Sc. Chemistry course structure is based on following credit framework as per the guidelines of the university and government of Maharashtra.

Credit Framework for M.Sc. Chemistry Programme

Level	Semester	Credits Related to Major		Research Methodology (RM)	Internship Job Training (OJT)	Research Project (RP)	Total
6.0	I	10 (T) + 4 (P)	2 (T) + 2 (T/P)	4	0	0	22
	II	10 (T) + 4 (P)	2 (T) + 2 (T/P)	0	4	0	22
Exit Option: Award of PG Diploma on Completion of 44 credits at 6.0 level (PG First Year) or Continue with PG Second Year							
6.5	III	10 (T) + 4 (P)	2 (T) + 2 (T/P)	0	0	4	22
	IV	8 (T) + 4 (P)	2 (T) + 2 (T/P)	0	0	6	22
Total 4 Years		54	16	4	4	10	88
Abbreviation: T – Theory, P - Practical							

Guidelines for conduction of classes:

- a) A student has to attend 1-hour classroom teaching per week for one credit of theory and 2 hours' lab work/problem-solving session/ related activities per week for one credit of practical. Practical sessions (lab work/problem-solving session/related activity) will be conducted in batches. A batch for such sessions will be of size maximum of 08 students.

- b) 4 Credit courses will have 60 lectures (48 L + 12 T) and 2 Credit courses will have 30 lectures (24 L + 6 T)
- c) The Department may conduct necessary lectures/workshops as a part of OJT.
- d) Each course of 4 credits will carry 100 marks and 2 credit courses will carry 50 marks.
- e) There will be Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) for each course.

Evaluation process:

- a) The CIE will be based on minimum two internal tests (IT). In addition, a teacher may consider one or more of the following. (i) Home Assignments (ii) Seminar/Presentation (iii) Laboratory assignment (iv) Group Discussions (v) Oral (vi) Research Paper/Book Review (vi) Technology Demonstration (vi) Case study (vii) Survey report, etc.
- b) Students has to score a minimum of 40 % separately in CIE and SEE, otherwise the result of such a course will be FAIL.

Eligibility:

B.Sc. Chemistry/B.Sc. (Blended) Chemistry/ B.E./B.Tech. with Chemistry subject (at least in second year) as per the rules and regulations given by Savitribai Phule Pune University, Pune.

2. Programme Outcomes (POs)

PO No.	PO Statement After completing the Master of Science degree students are able to	Knowledge and Skill
PO-1	Learn the terms, theories, assumptions, methods, principles, theorem statements and classification	Disciplinary knowledge
PO-2	Fix out the problem and resolve it using theories and practical knowledge.	Critical thinking and Problem solving
PO-3	Inculcate his knowledge for carrying projects and advanced research related skills.	Research related skill
PO-4	Actively participate in team on case studies and field-based situations.	Cooperation/Team work
PO-5	Analyze and interpret ideas, evidences and experiences with learned scientific reasoning	Scientific reasoning
PO-6	Aware and implement the subject facts that can be applied for the personal and social development	Reflective thinking
PO-7	Use digital literacy to retrieve and evaluate subject related information	Information/Digitally literacy
PO-8	Get moral and ethical values for society as well as in research	Moral and ethical awareness
PO-9	Give analytical reasoning to interpret research data.	Analytical Reasoning
PO-10	Improve their managerial skills and abilities in subject related activities.	Leadership readiness/qualities
PO-11	Inculcate continuous learning habit through all available resources.	Lifelong readiness/qualities

3. Programme Specific Outcomes (PSOs)

PO-No.	Outcomes	Component
PSO-1	Demonstrate a comprehensive knowledge of all disciplines.	Disciplinary knowledge
PSO-2	To assess and evaluate facts, claims and arguments using their scientific knowledge	Critical thinking
PSO-3	To define a problem, analyse, interpret and draw conclusion by planning, implementing and reporting the results of an experiment.	Research-related skills
PSO-4	To access, evaluate and apply a variety of useful sources	Information/digital literacy
PSO-5	To participate in multicultural society and communicate the subject knowledge for the betterment of society	Multicultural competence
PSO-6	To acquire knowledge and skills including “Learning how to learn” that are necessary in learning activities throughout life	Lifelong learning

4. Course Structure

M. Sc. Chemistry Part-I

(Physical Chemistry, Inorganic Chemistry and Analytical Chemistry)

Semester I

Sr. No.	Course Title	Course Code	Major Core/ Major elective	Credits
1	Physical Chemistry-I	CHE-501	Major Core	4
2	Inorganic Chemistry-I	CHE-502	Major Core	4
3	Organic Chemistry-I	CHEPIA-503	Major Core	2
4	Physical Chemistry Practical -I	CHE-504	Major Core	2
5	Inorganic Chemistry Practical-I	CHE-505	Major Core	2
6	Organic Chemistry Practical-I	CHE-506	Major elective	2
7	Chemical Mathematics	CHE-507(A)	Major elective	2
	Chemistry of Nanomaterials	CHE-507(B)		
	Analytical Chemistry	CHE-507(C)		
	Basic Organic Chemistry	CHEPIA-507(D)		
8	Research Methodology	CHE-508	RM	4

Semester II

Sr. No.	Course Title	Course Code	Major Core/ Major elective	Credits
1	Physical Chemistry-II	CHE-551	Major Core	4
2	Inorganic Chemistry-II	CHE-552	Major Core	4
3	Organic Chemistry-II	CHEPIA-553	Major Core	2
4	Physical Chemistry Practical -II	CHE-554	Major Core	2
5	Inorganic Chemistry Practical-II	CHE-555	Major Core	2
6	Organic Chemistry Practical-II	CHE-556	Major elective	2
7	Organometallic Compounds and Inorganic Reaction Mechanism	CHE-557(A)	Major elective	2
	Material Characterization Techniques	CHE-557(B)		
	Green Chemistry	CHE-557(C)		
	Pericyclic Reactions and Photochemistry	CHEPIA-557(D)		
8	On-Job Training/Internship	CHE-558	OJT/Internship	4



Est. 27/11/1928

Department of Chemistry
SNJB's KKHA Arts, SMGL Commerce and SPHJ Science College, Chandwad
Dist- Nashik, Maharashtra- PIN-423 101

(DST-FIST Funded December-2018)

☎(02556) Off. 252125 Res.252126 Tel. Fax: 02556-252125

P. O. Box No.: 6 • E-mail: alccchandwad@yahoo.co.in

Website: www.acschandwadcollege.com

Dr. R. S. Sancheti (Head, Dept. of Chemistry)

E-mail: sanchet83@gmail.com

M.Sc. I Organic Chemistry On Job Training Student List 2023-24

Sr. No.	Name Of Student
1	AHER GAURAV D
2	AHER MANASI S
3	AHER TEJAS V
4	AHIRE NUTAN D
5	AHIRRAO PAYAL A
6	BACHHAV DHANSHRI J
7	BARVE VIJAYA N
8	BHADANE JAYASHRI R
9	BHAVAR PALLAVI S
10	BHUSE KALPESH R
11	CHANDWADE SAKSHI N
12	CHAVAN KANCHAN S
13	DEORE SIDDHI K
14	GAIKAWAD PRAJAKTA S
15	GAWANDHE DILIP T
16	JADHAV RAHUL S
17	KAJAL BABAJI G
18	KANDALKAR PRIYA R
19	KANGUNE BHAGYASHRI R
20	KAWADE VAISHNAVI V
21	KHAN SARANJUM K
22	MOHAMMED MUZAMMIL M
23	MOMIN SABA KAUSAR K
24	NAUSHEEN NIKHAT L
25	NAVALE SARIKA D
26	PAGAR SONALI A
27	PANSARE HARSHADA K
28	Pavse Krishnakant D.

29	PAWAR DISHA S
30	Pawar Gayatri P.
31	PAWAR MANISHA M
32	SAINDANE SAURAV A
33	SASALE MRUNALI D
34	SHEDGE KALYANI S
35	SHEWALE SAKSHI S
36	SHINDE GAYATRI S
37	SHINDE SHITAL D
38	SHIRUDE NIKITA R
39	SONAWANE NIKITA N
40	SONAWANE PUNAM S
41	SONAWANE SIMA D
42	SURSE HARSHALI C
43	THAKARE DHANSHRI U
44	THORAT PRAJWAL B
45	VAISHNAVI KAILAS P

Ressanbi
HEAD

Department of Chemistry
SNJB's K.K.H.A.Arts, S.M.G.L.Commerce
& S.P.H.J.Science College,
Chandwad-423 101 Dist- Nashik



ARNI
ANALYTICALS



☎ : 9307686710

Date:- 05/12/2022

To,

The PRINCIPAL

SNJB'S KKHA Arts, SMGL Commerce & SPHJ Science College,
Chandwad, Nashik

**SUBJECT :- Collaboration between ARNI Analytical and SNJB'S KKHA Arts, SMGL
Commerce & SPHJ Science College Chandwad. Nashik**

Respected Sir,

We are collaborating with SNJB's KKHA Arts, SMGL Commerce & SPHJ Science
College Chandwad, Nashik.

The Intent of this collaboration is to provide training to M. Sc. Chemistry students. It was
decided to provide training on the Instruments which are required in pharmaceutical industries.
We agree to facilitate college training workshops, lecture and internship etc. I hope that college
will also provide their infrastructure for smooth working. This collaboration is from December-
2022 to December-2026

DIRECTOR

Mr. Masum G. Deshmukh
ARNI Analytical, Nashik



ON JOB TRAINING

(Pharmaceutical Industrial Analysis)

Report Of A Project Carried Out As A Part Of Curriculum For The

MSC -I [CHEMISTRY] CHE-558 TRAINING /INTERNSHIP

[4 CREDIT ,120 HOURS]

Submitted By

Zalte Shahaji Subhash

[M.Sc.-I -(ORGANIC / ANALYTICAL CHEMISTRY)]

Supervised By

Mr .Masum G.Deshmukh

ARNI ANALYTICAL

Dr.R.S.Sacheti [Faculty Coordinator]

Associate Professor

Submitted To

Savitribai Phule Pune University, Pune [2023-2024] Department Of Chemistry ,

NAME OF COLLAGE

KKHA ARTS, SMGL COMMERS AND SPHJ SCIENCE COLLAGE CHANDAWAD

Affiliated To

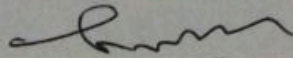
DECLARATION BY THE CANDIDATE

I hereby declared that this project entitled “**ON JOB TRAINING (Pharmaceutical Industrial Training)**” is bonfied and genuine project work carried out by us under supervision of **Mr. Masum G. Deshmukh** from ARNI ANALYTICAL

Date:- 02/05/2024

Place:- CHANDAWAD

ZALTE SHAHAJI SUBHASH



SIGNATURE OF THE STUDENT

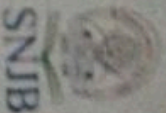


ARNI
ANALYTICAL

Acc. Partipal App. Part No. 102, Lane No. 3,
Near Neurocare Hospital, Pandh Colony, Nashik
e-mail: amara@arni.co.in



Shri Nemibhaji Jain Brahmacharyashram (JainGurukul's)
Karmveer Keshavlaji Harakchandji Abad Arts,
Shriman Motilaji Giridharilaji Lodha Commerce
and Shriman P.H. Jain Science College,
Neminagar, Chandwad, Dist. Nashik -423101



Certificate

This is to certify that *Shahaji Subhash Zalhe*
Student of "Department of Chemistry, SNJB's ACS College,
Chandwad, Nashik" Studied in M.Sc.- 1 yr. (Organic chemistry)
has Successfully completed on job Training Course in
Pharmaceutical Industrial Analysis of 120 hrs.
The training period is from .21-03-2024 to 20-04-2024

P. S. Patel

H.O.D.

P. S. Patil

Principal

P. S. Patil

Director

CERTIFICATE BY THE FACULTY COORDINATOR

This is to certify that entitled "ON JOB TRAINING (Pharmaceutical Industrial Training). The training work done by *Zalte Shahaji Subhash* fulfilment of the requirement for MSc -I [ORGNIC/ANALYTICAL CHEMISTRY] CHE 558 On Job Training/ Internship [4 Credits,120 hours]

Date- 02/05/2024

Place- CHANDAWAD

Dr.R.S.Sancheti

Associate Professor

Department of Chemistry

NAME OF COLLAGE

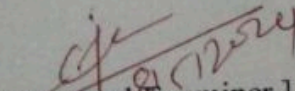
KKHA ARTS, SMGL COMMERS AND SPHJ SCIENCE COLLAGE CHANDWAD

CERTIFICATE BY THE EXTERNAL EXAMINER

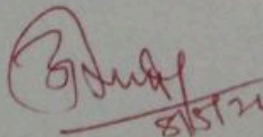
This is to certify that entitled "ON JOB TRAINING (Pharmaceutical Industrial training)" is a bonafide and genuine project work done by *Zalte Shahaji Subhash* fulfilment of the requirement of MSc – I [Organic/Analytical Chemistry] CHE-558, On job training/ Internship [4 credits, 120 hours].

Date:-02/05/2024

Place:-CHANDWAD


[External Examiner]

Name & Signature


[Internal Examiner]

Name & Signature

ACKNOWLEDGEMENT

We would like to take the privilege to thank the selfless people from the core of our heart who with their constant support, affection, inspiration and encouragement made us feel comfortable to successfully complete this venture.

Our deep sense of gratitude and thanks to my supervisor **Mr Masum G. Deshmukh** for his expert guidance, constant encouragement, stimulating discussion .

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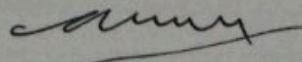
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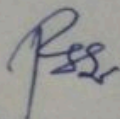
Zalte Shahaji Subhash



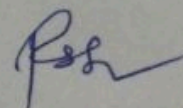
Signature of the student

CERTIFICATE

This is to certify that projected entitled "ON JOB TRAINING (Pharmaceutical Industrial Training)" The Training work done by **ZALTE SHAHAJI SUBHASH** under supervision of Mr Masum G. Deshmukh



Department of Chemistry
Head of Department
SNJB's K.K.H.A.Arts, S.M.G.L.Commerce
& S.P.H.J.Science College,
Chandwad-423 101 Dist- Nashik



[Faculty Coordinator]

Principal

(Name of College)

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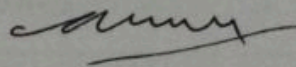
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Date-

Place-

Zalte Shahaji Subhash



Signature of the student

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1. Introduction of Industries:

The pharmaceutical industry has a number of unusual characteristics that make it very different from what people normally think of as industry. It is also an industry replete with contradictions; for example, despite the undisputed fact that for over a century the industry has made a major contribution to human wellbeing and the reduction of ill health and suffering, it is still regularly identified by the public in opinion surveys as one of the least trusted industries, often being compared unfavourable to the nuclear industry. It is undoubtedly one of the riskiest businesses in which to invest money, yet it is perceived by the general public to be excessively profitable. The major pharma companies rightly promote themselves as being

research-based organisations, yet most people believe that they spend more on marketing than on research. Despite the acknowledged risks and costs associated with pharmaceutical development, many citizens still believe that pharmaceuticals should be being developed to meet all human needs and that when developed they should be given away to everyone on the basis of need.

2. Department in Pharmaceutical companies:

1. Research and Development (R&D) Department
2. Clinical Development Department
3. Regulatory Affairs Department
4. Manufacturing Department
5. Quality Assurance Department
6. Sales and Marketing Department
7. Supply Chain Management Department

8. Human Resources Department
9. Finance and Accounting Department

3. Medicines:

Types of medicines

Most medicines come in a variety of types or formats. Be aware, though, that some medicines (particularly rare or unusual ones) only come in one type. Also, some may be more effective in one type than another.

Preparations

In the UK, medicines often come in some of the following preparations:

Liquid

The active part of the medicine is combined with a liquid to make it easier to take or better absorbed. A liquid may also be called a 'mixture', 'solution' or 'syrup'. Many common liquids are now available without any added colouring or sugar.

Tablet

The active ingredient is combined with another substance and pressed into a round or oval solid shape. There are different types of tablet. Soluble or dispersible tablets can safely be dissolved in water.

Capsules

The active part of the medicine is contained inside a plastic shell that dissolves slowly in the stomach. You can take some capsules apart and mix the contents with your child's favourite food. Others need to be swallowed whole, so the medicine isn't absorbed until the stomach acid breaks down the capsule shell.

Other types of medicine:

Topical medicines

These are creams, lotions or ointments applied directly onto the skin. They come in tubs, bottles or tubes depending on the type of medicine. The active part of the medicine is mixed with another substance, making it easy to apply to the skin.

Suppositories

The active part of the medicine is combined with another substance and pressed into a 'bullet shape' so it can be inserted into the bottom. Suppositories mustn't be swallowed.

Drops

These are often used where the active part of the medicine works best if it reaches the affected area directly. They tend to be used for eye, ear or nose.

Inhalers

The active part of the medicine is released under pressure directly into the lungs. Young children may need to use a 'spacer' device to take the medicine properly. Inhalers can be difficult to use at first so your pharmacist will show you how to use them.

Injections

There are different types of injection, in how and where they're injected. Subcutaneous or SC injections are given just under the surface of the skin. Intramuscular or IM injections are given into a muscle. Intrathecal injections are given into the fluid around the spinal cord. Intravenous or IV injections are given into a vein. Some injections can be given at home but most are given at your doctor's surgery or in hospital.

4. Pharmacopeia:

A pharmacopoeia is a legally-binding collection, prepared by a national or regional authority, of standards and quality specifications for medicines used in that country or region.

Some 60 pharmacopoeias (national, regional and subregional and international) are listed in the index compiled by WHO.

WHO initiated steps based on discussion during meetings of the International Conference of Drug Regulatory Authorities (ICDRA), especially the 10th ICDRA meeting held in Hong Kong in 2002, and a further discussion among regulators during the 11th ICDRA meeting held in Madrid in 2004, to organize an official meeting entitled International meeting of world pharmacopoeias for participation of all WHO Member States' pharmacopoeias worldwide, be they national, regional or international.

5. Instrument used in pharmaceutical industry:

Pharmaceutical manufacturing equipment includes a wide variety of equipment, such as capsule filling machines, x-ray inspection systems, and spray drying accessories. In order to ensure precise manufacturing and formulation development, almost every process can be automated.

Types of analytical lab equipments are –

a) ANALYTICAL BALANCE :

What is an Analytical Balance? Analytical balances are an extremely accurate laboratory balance created to precisely measure the mass of an object. Offering a readability up to 0.00001 grams (0.01 mg), analytical balances are frequently used in laboratories.

b) DIGITAL pH METER :

What does a pH meter measure? An electronic pH meter is used to obtain more accurate pH measurements. A pH meter is an instrument used to measure hydrogen ion activity in solutions - in other words, this instrument measures acidity/alkalinity of a solution.

The working principle behind pH meters is potentiometry. This is the measurement of a solution's electric potential (voltage). Remember how acidic solutions can efficiently conduct an electric current because of the positive hydrogen ions? The ability of a solution to conduct a current is called electric potential.

c) UV - VISIBLE SPECTROPHOTOMETER:

Ultraviolet-visible (UV-Vis) spectrophotometers use a light source to illuminate a sample with light across the UV to the visible wavelength range of the electromagnetic spectrum (typically 190 to 900 nm). The UV range normally extends from 100 to 400 nm, with the visible range from approximately 400 to 800 nm. The Principle of UV-Visible Spectroscopy is based on the absorption of ultraviolet light or visible light by chemical compounds, which results in the production of distinct spectra. Spectroscopy is based on the interaction between light and matter.

UV Visible Spectrophotometer

Electron transition takes place, so it is also called electron spectroscopy.

It is a cost-effective, simple, versatile, and non-destructive technique.





HPLC (High Paper Liquid Chromatography)



d) IR SPECTROSCOPY:

IR spectroscopy detects the absorption of light by a compound, in the IR region of the electromagnetic spectrum. To absorb light a molecule must have a bond within its structure that can exhibit what is referred to as a 'dipole moment' which means electrons within a bond are not shared equally.

Infrared spectroscopy (IR) is used in the areas of determination of molecular structure, identification of chemical species, quantitative/qualitative determination of chemical species, and in a host of other applications. This technique is used in the investigation of matter in the solid, liquid, and gaseous states.

e) HPLC:

High-performance liquid chromatography (or high-pressure liquid chromatography, HPLC) is a chromatographic technique that can separate a mixture of compounds and is used in biochemistry and analytical chemistry to identify, quantify and purify the individual components of the mixture.

The purpose high performance liquid chromatography (HPLC) analysis of any drugs is to confirm the identity of a drug and provide quantitative results and also to monitor the progress of the therapy of a disease.

f) gas chromatography :

Gas chromatography (GC) is an analytical technique applicable to gas, liquid, and solid samples (components that are vaporized by heat). If a mixture of compounds is analyzed using GC system, each compound can be separated and quantified.

Principle of gas chromatography: The sample solution injected into the instrument enters a gas stream which transports the sample into a separation tube known as the "column." (Helium or nitrogen is used as the so-called carrier gas.) The various components are separated inside the column.

THANK YOU