



Vidya Prasarak Mandal's
**Advanced Study
Center**



Syllabus for
Programme :P. G. Diploma
Course : Applied Analytical
Chemistry

With effect from academic year

2016 - 2017

Syllabus and Question Paper Pattern of Course :Applied Analytical Chemistry

Course Code	Course Title	No. of lectures	Credits
ASCAAC01	Fundamentals of Analytical Chemistry & Chromatography	36	3
ASCAAC02	Chromatographic techniques	36	3
ASCAAC03	Instrumental Methods of Chemical Analysis	36	3
ASCAAC04	Environmental Science, Electro analytical methods and Regulatory aspects	36	3
ASCAACP1	Practical Training I	30	4
ASCAACP2	Practical Training II	30	4
ASCAACP3	Dissertation	40	4
ASCAACP3	Industrial Visits	40	4
Total Credits			28

Course Code: ASCAAC01	Course Title Fundamentals of Analytical Chemistry & Chromatography	No. of lectures
Unit I: A) Introduction to Analytical Chemistry & Basic Physico Chemical Principles B) Errors, Precision and Accuracy		12
Unit II: A) Volumetric Analysis B) Gravimetric analysis		12
Unit III: A) Sampling techniques B) Separation Techniques		12

Course Code: ASCAAC02	Course Title Chromatographic techniques	No. of lectures
Unit I: Basic theory of chromatography A) Introduction to chromatography B) Introduction to column chromatography		12
Unit II: Gas Chromatography and HPLC A) Gas chromatography (GC) B) High performance Liquid Chromatography (HPLC)		12
Unit III: Other techniques of Chromatography		12

Course Code: ASCAAC03	Course Title Instrumental Methods of Chemical Analysis	No. of lectures
Unit I: UV Visible and IR spectroscopy A) Colorimetry, Ultraviolet and Visible Spectroscopy B) Infrared Absorption Spectroscopy		12
Unit II: NMR and Mass spectroscopy A) NMR spectroscopy B) Mass spectroscopy		12
Unit III: Atomic spectroscopy B) Flame photometry C) Atomic Absorption Spectroscopy (AAS)		12

Course Code: ASCAAC04	Course Title Environmental Science, Electro analytical methods and Regulatory aspects	No. of lectures
Unit I: A) Water pollution and Technical (Theoretical) Aspects of Water Analysis B) Air C) Introduction to soil Analysis:		12
Unit II: Electro analytical methods and Thermal methods A) Electro analytical methods B) Thermal methods		12
Unit III: Introduction to Regulatory Aspects, Limit test and safety in laboratory A) Regulatory aspects B) Limit test C) Safety in chemical laboratory		12

Course Code:	Course Title
ASCAACP1	Practical Training I- Non-instrumental
<ul style="list-style-type: none"> • To determine strength of commercial Hydrochloric acid. • Tests for food adulteration. • To determine % acetyl salicylic acid content in Disprin dispersible tablets 350 mgs. • To analyse the given sample of Brass Alloy for its Cu content by iodometry. • To determine the Viscosity of the given liquid using Oswald's Viscometer. • To determine Surface Tension of the given liquid using Stalagmometer (Drop Number method). • To test bore well water for Chloride, Sulphate, Arsenic, Heavy metals and Iron. • To determine the % of available Chlorine present in the given sample of bleaching powder. • To estimate amount of Glucose by Folin Wu method. • Determination of hydrogen peroxide in terms of (I) volume strength (ii) gm/dm³. • To determine the moisture contents present in the given sample of organic compound by using Karl Fischer reagents. • To analyse the given sample using Thin Layer Chromatography [TLC]. • Dissolve Oxygen [Titrimetric Method (Winkler Method)]. • Hardness of Water. • Soil Analysis. • To determine percentage assay of Mebendazole IP tablets with non-aqueous titration. • To determine Ion Exchange capacity of Ion Exchange Resin. 	

Course Code:	Course Title
ASCAACP2	Practical Training II- Instrumental
<ul style="list-style-type: none"> • To determine the amount of Mn (VI) and Cr (VII) in the given solution by simultaneous spectrophotometric method. • To determine the acetic acid contents in the given Vinegar solution using pH- meter. • To determine the concentration of the dye in given solution by using Spectrophotometer. • To determine the concentration of an optically active compound using Polarimeter. • Estimation of Halides potentiometrically. • To determine amount of Fe (III) present in the given solution using Photometric titration. • To analyse Na⁺ and K⁺ in electrical powder using Flame photometer. • Simultaneous determination of Fe (II) & Fe (III) by Spectrophotometric method. • Demonstration of Gas Chromatography (GC) instrument. • To determine refractive index of given liquid from Abbe's Refractometer. 	

All practicals should be entered in the journal. Only candidates with certified journal will be allowed for examination.

Course Code: ASCAACP3	Course Title Dissertation
<p>Duration: 3 months</p> <p>Based on any subtopic from the syllabus or related to Applied Analytical Chemistry under the guidance of expertise from within or outside the institution.</p> <p>Guidelines for Dissertation:</p> <ol style="list-style-type: none"> 1. Students have to select their topic in consultation with the guide, who can be any faculty teaching the course or expert in the subject. (If the expert is not a teaching faculty of the course, biodata of expert is to be submitted in Advanced Study Centre and approval to be taken from Head, Advanced Study Centre.) 2. The outline of the dissertation (about 2/3 pages – 400/600 words) signed by the student & guide to be submitted on or before 31st December to Advanced Study Centre. 3. The student has to collect the data, relevant information, photographs, references in consultation of guide. 4. The dissertation in the hard bound format based on this data has to be submitted on or before 31st March to Advanced Study Centre. 5. Dissertation book should have certificate page signed by their respective guides and coordinator of the course. 6. Final power point presentation should be given by students at the time of examination. 7. Dissertation will comprise 75 Marks 	

Format for submission of outline for dissertation

Front page

Title of the topic:	
Place of work: VPM's Advanced Study Centre.	
Name of the student:	
Name of the guide:	
Date of submission:	
Sign of guide	Sign of student

Details: Introduction, Review of Literature, Material & methods, Hypothesis, Results & Discussions, Conclusions, References.

Course Code: ASCAACP4	Course Title Industrial visits
<p>Students will have to bear their own expenses for the Industrial visits.</p> <p>Industrial visit: Note book - Students have to maintain Industrial visit- note book along with the photos at places visited. The observations have to be noted in Industrial visit- note book/ register. Diagrams/ drawings can be drawn or photographs can be stuck. Industrial visit- note book has to be presented at the time of practical examination.</p> <p>Examination based on which viva voce will be conducted. (25 marks)</p> <p>Industrial Visits/ Training that can be taken from among following or such similar places:</p> <ol style="list-style-type: none">1. Reliable Analytical Laboratories Pvt. Ltd. Bhiwandi, Thane.2. Tata Institute of Fundamental Research, Mumbai.	

Evaluation Scheme:**Theory Examination: Suggested format of Question paper****Duration: 3 hours****Total Marks: 100**

- All questions are compulsory

Q. 1	Based on unit I	25
	OR	
Q. 1	Based on unit I	25
Q. 2	Based on unit II	25
	OR	
Q. 2	Based on unit II	25
Q. 3	Based on unit III	25
	OR	
Q. 3	Based on unit III	25
Q. 4	Based on unit I, II, III	25
	OR	
Q. 4	Based on unit I, II, III	25

Each question may consists of sub questions of following types

Full length question: 15 Marks

Short answer question: 10 Marks

Short note questions: 5 Marks

Objectives: 2 Marks

Total marks of Theory Examination:

Course Code	Maximum marks
ASCAAC01	100
ASCAAC02	100
ASCAAC03	100
ASCAAC04	100
TOTAL	400

Practical Examination:

Course Code	Details	Practical	Journal	Viva	Total
ASCAACP1	Practical- I	80	10	10	100
ASCAACP2	Practical- II	80	10	10	100
ASCAACP3	Dissertation	-	-	-	75
ASCAACP4	Industrial visit: Note book	-	-	-	25
	TOTAL				300

Total of Theory Examination: 400 Marks**Total of Practical Examination: 300 Marks****Grand Total: 700 Marks**