

ANNEXURE 18B06

V.V. VANNIAPERUMAL COLLEGE FOR WOMEN



(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

**CHOICE BASED CREDIT SYSTEM
REGULATIONS AND SYLLABUS
(with effect from Academic Year 2018 - 2019)**

V.V. Vanniaperumal College for Women, Virudhunagar, established in 1962, offers 19 UG Programmes, 14 PG Programmes, 6 M.Phil. Programmes and 3 Ph.D. Programmes. All these programmes, except Ph.D. Programmes, have been framed as per the guidelines given by UGC under Choice Based Credit System (CBCS).

The Departments of Commerce, English and History upgraded as Research Centres offer Ph.D. Programmes as per the norms and regulations of Madurai Kamaraj University, Madurai and do not come under the purview of CBCS.

CHOICE BASED CREDIT SYSTEM (CBCS)

The CBCS provides an opportunity for the students to choose courses from the prescribed Courses. The CBCS is followed as per the guidelines formulated by the UGC. The Students' performance will be evaluated based on the uniform grading system. Computation of the Cumulative Grade Point Average (CGPA) is made to ensure uniformity in evaluation system.

List of Programmes in which CBCS/Elective Course System is implemented

UG PROGRAMMES

- Arts & Humanities : History (E.M. & T.M.), English and Tamil
- Physical & Life Sciences : Mathematics, Zoology, Chemistry, Physics, Biochemistry, Home Science - Nutrition and Dietetics, Costume Design and Fashion, Microbiology, Biotechnology, Computer Science, Information Technology and Computer Applications.
- Commerce & Management : Commerce, Commerce with Computer Applications, Commerce with Professional Accounting Business Administration.

PG PROGRAMMES

Arts & Humanities	:	History, English, Tamil
Physical & Life Sciences	:	Mathematics, Physics, Biochemistry, Food Processing & Quality Control, Chemistry, Zoology, Computer Science, Information Technology, Computer Applications (MCA*)
Commerce & Management	:	Commerce, Business Administration (MBA*)

* AICTE approved Programmes

PRE-DOCTORAL PROGRAMMES (M.Phil.)

Arts & Humanities	:	History, English, Tamil
Physical & Life Sciences	:	Mathematics, Biochemistry
Commerce & Management	:	Commerce

OUTLINE OF CHOICE BASED CREDIT SYSTEM

1. Core Courses
2. Elective Courses
 - 2.1. Discipline Specific Elective Courses (DSEC)
 - 2.2. Dissertation / Project
3. Non Major Elective Courses (NMEC)
4. Generic Elective Courses (GEC)
5. Ability Enhancement Courses (AEC)
 - 5.1 Ability Enhancement Compulsory Courses (AECC)
 - 5.2. Skill Enhancement Courses (SEC)

List of Non Major Elective Courses (NMEC) offered

UG PROGRAMMES

Name of the Course	Semester	Department
Indian National Movement (A.D 1885-1947)	III	History(EM)
இந்திய Njrpய இயக்கம் (கி.பி. 1885 – 1947)	III	History (TM)
Constitution of India	IV	History(EM)
இந்தியாவில் அர்பயல் அமைப்பு	IV	History(TM)
Communication Skills-I	III	English
Communication Skills-II	IV	
இக்காலநீதி இலக்கியம்	III	Tamil
உரைநடை இலக்கியம்	IV	
Basic Hindi - I	III	Hindi
Basic Hindi - II	IV	
Practical Banking	III	Commerce
Basic Accounting Principles	IV	
Business Management	III	Business Administration
Entrepreneurship Development	IV	
Quantitative Aptitude – I	III	Mathematics
Quantitative Aptitude - II	IV	
Physics in Everyday life	III	Physics
Digital Electronics	IV	
Industrial Chemistry-I	III	Chemistry
Industrial Chemistry-II	IV	
Applied Zoology	III	Zoology
Animal Science	IV	
Basic Food Science	III	Home Science – Nutrition and Dietetics
Basic Nutrition and Dietetics	IV	
Women and Health	III	Biochemistry
Life style associated disorders	IV	
Medical Lab Technology	III	Microbiology
Applied Microbiology	IV	
Infectious Diseases	III	Biotechnology
Organic Farming	IV	
Basics of Fashion	III	Costume Design And Fashion
Interior Designing	IV	
Introduction to Computers and Office Automation	III	Computer Science
Introduction to Internet and HTML 5	IV	
Computer Fundamentals and E-mail	III	Information Technology
Introduction to HTML	IV	
Fundamentals of Computers	III	Computer Applications
Web Design with HTML 5	IV	
Horticulture – I	III	Botany
Horticulture – II	IV	
மருத்துவ தாவரவியல் - I	III	
மருத்துவ தாவரவியல் - II	IV	
Library and Information Science – I	III	Library Science
Library and Information Science - II	IV	

List of Generic Elective Courses (GEC) Offered

GENERIC ELECTIVE COURSES – 1

1. Human Rights/
2. Women Studies

GENERIC ELECTIVE COURSES – 2

1. Constitution of India/
2. Modern Economics/
3. Adolescent Psychology/
4. Disaster Management

ABILITY ENHANCEMENT COMPULSORY COURSES (AECC)

1. Environmental Studies
2. Value Education

மேல்நிலைக் கல்வி வரை தமிழை முதன்மைப் பாடமாக எடுத்துப் படிக்காத மாணவிகள் கீழ்க்கண்ட பாடங்களைக் கட்டாயம் படிக்க வேண்டும்.

1. அடிப்படை தமிழ் -எழுத்தறிதல்
2. அடிப்படைத் தமிழ் -மொழித்திறனறிதல்

ELIGIBILITY FOR ADMISSION

Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Education, Tamilnadu or any other equivalent Examination accepted by Academic Council with Mathematics/Botany as one of the subjects in Higher Secondary Course.

DURATION OF THE PROGRAMME

The candidates shall undergo the prescribed Programme of study for a period of three academic years (six semesters).

MEDIUM OF INSTRUCTION

English

COURSES OFFERED

- Part I : Tamil/Hindi
- Part II : English
- Part-III : Core Courses
 Elective Courses: Discipline Specific Electives Courses
 Field Project
 Allied Courses: 1. Mathematics /Botany
 2. Physics
- Part IV: Non-Major Elective Courses (NMEC)
 Generic Elective Courses (GEC)
 Ability Enhancement Compulsory Courses (AECC)
 Skill Enhancement Courses (SEC)
- Part V: National Service Scheme, Physical Education, Youth Red Cross Society, Red Ribbon Club, Science Forum, Eco Club, Library and Information Science, Consumer Forum, Health and Fitness Club

Study Tour/ Field visit is mandatory for UG students.

Internship / Field Project is compulsory for II year UG Science students

Internship: A designated activity that carries one credit involving more than 7 days of working in an organization under the guidance of an identified mentor

Field Project: Project students need to undertake project that involve conducting surveys inside/outside the college premises and collection of data from designated communities or natural places

EVALUATION SCHEME

Components	Internal Assessment Marks	External Examination Marks	Total Marks
Theory	25	75	100
Practical	40	60	100
Project	40	60	100

PART III - Core Courses, Discipline Specific Elective Courses & Allied Courses

INTERNAL ASSESSMENT**Distribution of Marks****Theory**

Mode of Evaluation		Marks
Periodic Test	:	15
Assignment	:	5
Quiz	:	5
Total	:	25

Three Periodic Tests - Average of the best two will be considered

Two Assignments - Best of the two will be considered

Three Quiz Tests - Best of the three will be considered

Practical

Mode of Evaluation		Marks
Model Test	:	30
Performance	:	10
Total	:	40

Two Model Tests - Best one will be considered

Performance - Attendance and Record

Question Pattern for Periodic Tests**Duration: 2 Hours**

Section	Type of Question	No. of Questions	No. of Questions to be answered	Marks for each question	Total Marks
A Q. No.(1- 4)	Multiple choice	4	4	1	4
B Q. No.(5 - 7)	Either or type	3	3	7	21
C Q. No.(8-10)	Open Choice	3	2	10	20
Total					45

EXTERNAL EXAMINATION**Question Pattern****Duration: 3 Hours**

Section	Type of Question	No. of Questions	No. of Questions to be answered	Marks for each question	Total Marks
A Q. No.(1- 10)	Multiple choice (Atleast Two questions from each unit)	10	10	1	10
B Q. No.(11 -15)	Either or type (one set from each unit)	5	5	7	35
C Q. No.(16-20)	Open Choice (one from each unit)	5	3	10	30
				Total	75

CORE COURSES ASSESSMENT

Online Test will be conducted for the Core Courses in V & VI Semester.

Multiple Choice question Pattern will be followed.

PART IV - Skill Enhancement Courses and Non Major Elective Courses**INTERNAL ASSESSMENT****Distribution of Marks****Theory**

Mode of Evaluation		Marks
Periodic Test	:	25
Assignment	:	10
Quiz	:	5
Total	:	40

Three Periodic tests - Average of the best two will be considered

Two Assignments - Best of the two will be considered

Three Quiz Tests - Best of the three will be considered

Question Pattern**Duration: 1 Hour**

Section	Type of Question	No. of Questions	No. of Questions to be answered	Mark for each Question	Total Marks
A Q. No.(1- 4)	Open Choice	4	3	5	15
B Q. No.(5- 6)	Open Choice	2	1	10	10
Total					25

EXTERNAL EXAMINATION**Question Pattern****Duration: 2 Hours**

Section	Type of Question	No. of Questions	No. of Questions to be answered	Mark for each Question	Total Marks
A Q. No.(1- 8)	Open Choice	8	6	5	30
B Q. No.(9- 13)	Open Choice	5	3	10	30
Total					60

PART IV- Generic Elective Courses and Ability Enhancement Compulsory Courses

- Assessment by Internal Examiner only
- Model Examination is conducted after two periodic tests.
- Book and Study Material prepared by the Faculty Members of the respective departments will be prescribed.

ASSESSMENT PATTERN

Mode of Evaluation		Marks
Periodic Test	:	30
Assignment	:	10
Model Examination	:	60
Total	:	100

Two Periodic tests - Best of the two will be considered

Two Assignments - Best of the two will be considered

Question Pattern for Periodic Test**Duration: 1 Hour**

Section	Type of Question	No. of Questions	No. of Questions to be answered	Mark for each Question	Total Marks
A Q. No.(1- 4)	Open Choice	4	3	6	18
B Q. No.(5- 6)	Open Choice	2	1	12	12
Total					30

Question Pattern for Model Examination**Duration: 2 Hours**

Section	Type of Question	No. of Questions	No. of Questions to be answered	Mark for each Question	Total Marks
A Q. No.(1- 8)	Open Choice	8	5	6	30
B Q. No.(9- 13)	Open Choice	5	3	10	30
Total					60

ELIGIBILITY FOR THE DEGREE

- i) The candidate will not be eligible for degree without completing the prescribed Courses of study and a minimum Pass marks in all the Courses.
- ii) Attendance, progress and conduct certification from the Head of the Institution will be required for the students to write the examination.
 - No Pass minimum for Internal Assessment.
 - Pass minimum for External Examination is 27 marks out of 75 marks for Core Courses, Allied Courses and Discipline Specific Elective Courses.
 - Pass minimum for External Examination is 21 marks out of 60 marks for Non Major Elective Courses and Skill Enhancement Courses.
 - The aggregate minimum pass percentage is 40.
 - Pass minimum for External Practical Examination is 21 marks out of 60 marks.
 - Pass minimum for Generic Elective Course and Ability Enhancement Compulsory Course is 40.

ATTENDANCE

The following rules are applicable to the students of all UG, PG and M.Phil. Programmes with effect from 2018-2019.

- a) The students with an attendance of 85% and above are permitted to appear for the Summative Examinations without any condition.
- b) The students with 78% - 84 % of attendance are permitted to appear for the Summative Examinations by paying a fine of ₹500/-
- c) The students with 66% - 77% of attendance can appear for the Summative Examinations only after getting special permission from the Principal. Special permission shall be granted by the Principal only on medical grounds and those students should also pay a fine of ₹1000/- along with the application form for exemption. If permission is not granted, they have to appear for the Summative Examinations in the next Semester by paying a fine of ₹1000/-
- d) The students who have less than 65% of attendance cannot appear for the Summative Examinations and have to repeat the whole semester .
- e) For Part V Courses, the students require 75% of attendance to get the required credit.
- f) For Certificate, Diploma, Advanced Diploma and Post Graduate Diploma Programmes, the students require 75% of attendance to appear for the Theory/Practical Examinations.

BACHELOR OF CHEMISTRY
PROGRAM CODE -2017

PROGRAMME OUTCOMES

- Encourage intellectually disciplined process of thinking in analyzing, synthesizing, evaluating and applying scientific concepts.
- Develop good rapport with fellow-beings through efficient oral, written and technical communication.
- Connect with the society to transform ideas into action.
- Volunteer support in spreading scientific temperament and stand for the national cause in all core issues.
- Uphold the values and beliefs inherent in the nation's tradition and culture.
- Strive to preserve nature in all forms for a sustainable future.
- Develop an independent and self-disciplined specialized learning in tune with the changing socio-technological scenario

PROGRAMME SPECIFIC OUTCOMES

- Obtain chemical knowledge concerning the fundamentals in the basic areas of Organic, Inorganic, Analytical and Physical Chemistry.
- Use standard laboratory equipments, modern instrumentation and classical techniques to carry out experiments.
- Know the proper procedures and regulations for safe handling and use of chemicals.
- Understand the transformation of chemical energy into electrical energy.

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PART – I-TAMIL

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	18UTAG11	தாள்: 1 பொதுத்தமிழ்	3	100
2.	II	18UTAG21	தாள்: 2 பொதுத்தமிழ்	3	100
3.	III	18UTAG31	தாள்: 3 பொதுத்தமிழ்	3	100
4.	IV	18UTAG41	தாள்: 4 பொதுத்தமிழ்	3	100
TOTAL				12	400

PART I -HINDI

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	18UHDG11	Prose – I & II, Ekganki - I, Short stories, Functional Hindi – I & Grammar	3	100
2.	II	18UHDG21	Drama, Ekganki – II, Letter Correspondence, Functional Hindi-II & Grammar	3	100
3.	III	18UHDG31	Ancient poetry, Drama, Indian History, Poetics and functional Hindi-III	3	100
4.	IV	18UHDG41	Modern poetry, History of Modern Hindi Literature and functional Hindi -IV	3	100
TOTAL				12	400

PART II

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	18UENG11A	English for Advanced Learners I	3	100
		18UENG11B	English for Career Guidance - I		
		18UENG11C	English for Communicative Competence-I		
2.	II	18UENG21A	English for Advanced Learners II	3	100
		18UENG21B	English for Career Guidance - II		
		18UENG21C	English for Communicative Competence - II		
3.	III	18UENG31A	English for Advanced Learners III	3	100
		18UENG31B	English for Career Guidance – III		
		18UENG31C	English for Communicative Competence - III		
4.	IV	18UENG41A	English for Advanced Learners IV	3	100
		18UENG41B	English for Career Guidance – IV		
		18UENG41C	English for Communicative Competence - IV		
TOTAL				12	400

PART III – CORE, DISCIPLINE SPECIFIC ELECTIVE COURSES

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1	I	18UCHC11	Inorganic Chemistry-I	4	100
2	I	18UCHC12	Organic and Physical Chemistry	4	100
3	II	18UCHC21	Organic Chemistry-I	4	100
4	II	18UCHC22	Inorganic and Physical Chemistry	4	100
5	II	18UCHC21P	Core Practical- I Volumetric Analysis	2	100
6	III	18UCHC31	Inorganic, Organic and Physical Chemistry-I	5	100
7	IV	18UCHC41	Inorganic, Organic and Physical Chemistry-II	5	100
8	IV	18UCHC41P	Core Practical –II Inorganic Semi-micro Qualitative Analysis	2	100
9	V	18UCHC51	Organic Chemistry-II	4	100
10	V	18UCHC52	Physical Chemistry-I	4	100
11	V	18UCHC53	Inorganic Chemistry-II	4	100
12	V	18UCHE51 18UCHE52	Discipline Specific Elective 1 (DSE 1) 1. Analytical Methods and Introduction to Computers 2. Nanotechnology	4	100
13	V	18UCHO51	Online Assessment	1	50
14	VI	18UCHC61	Organic Chemistry-III	4	100
15	VI	18UCHC62	Physical Chemistry-II	4	100
16	VI	18UCHC63	Applied Chemistry	4	100
17	VI	18UCHE61 18UCHE62	Discipline Specific Elective 2 (DSE 2) 1. Medicinal Chemistry 2. Industrial Chemistry	4	100
18	VI	18UCHO61	Online Assessment	1	50
19	VI	18UCHC61P	Practical –III Gravimetric Analysis and Organic Preparation	3	100
20	VI	18UCHC62P	Practical –IV Organic Analysis and Estimation	3	100
21	VI	18UCHC63P	Practical –V Physical Chemistry Experiments	2	100
Total				72	2000

PART III – ALLIED COURSE I- MATHEMATICS

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	18UMTA11	Mathematics –I	4	100
2.	II	18UMTA21	Mathematics – II	3	100
		18UMTA22	Mathematics - III	3	100
Total				10	300

PART III – ALLIED COURSE I- BOTANY

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	18UBYA11	Taxonomy of Angiosperms and Medicinal Botany	4	100
2.	II	18UBYA21	Applied Botany	3	100
		18UBYA21P	Allied Botany Practicals	3	100
Total				10	300

PART III - ALLIED COURSE II- PHYSICS

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	III	18UPHA31	Allied Physics-I	4	100
2.	IV	18UPHA41	Allied Physics-II	4	100
	IV	18UPHA41P	Allied Physics Practical -I	2	100
Total				10	300

PART IV -SKILL ENHANCEMENT COURSES

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	II	18UCHS21	Polymer Chemistry	2	100
2.	III	18UCHS31	Food Chemistry	2	100
3.	IV	18UCHS41	Leather Chemistry	2	100
4.	V	18UCHS51P	Analysis of Oils/Fats & Water Practical	2	100
5.	V	18UCHS52	Dairy Chemistry	2	100
6.	VI	18UCHS61	Green Chemistry	2	100
Total				12	600

PART IV –NON MAJOR ELECTIVE COURSES

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	III	18UCHN31	Industrial Chemistry-I	2	100
2.	IV	18UCHN41	Industrial Chemistry-II	2	100
Total				4	200

**PARTIV–GENERIC ELECTIVE AND ABILITY ENHANCEMENT
COMPUSORY COURSES**

S.No.	Sem.	Code	Title of the Course	Credits	Marks		
1.	I	18UGVE11	Value Education	2	100		
2.	III	18UGHR31 18UGWS32	Human Rights Women studies	1	100		
3.	IV	18UGEC41	Constitution of India	1	100		
4.		18UGEM42	Modern Economics				
5.		18UGEG43	Global Warming				
6.		18UGEA44	Adolescent psychology				
7.		18UGED45	Disaster Management				
8.		18UCHI41G	Internship/Field Project			1	100
9.		PART V	Extension Activities			1	-
10	V	18UGES51	Environmental Studies	2	100		
TOTAL				8	500		

PART –V EXTENSION ACTIVITIES

S.No.	Sem.	Code	Title of the Course	Credit
1	I, II, III & IV	18UVNS1	National Service Scheme	1
2		18UVNS2	Physical Education	
3		18UVYR1 18UVYR2	Youth Red Cross Society	
4		18UVRR1	Red Ribbon Club	
5		18UVSF1	Science Forum	
6		18UVEC1	Eco Club	
7		18UVLI1	Library and Information Science	
8		18UVCC1	Consumer Forum	
9		18UVHF1	Health and Fitness Club	



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BACHELOR OF CHEMISTRY

Programme Code – 2017

Semester	Course Code	Courses	Hours per week	Credits	Total Marks		
					Int.	Ext.	
I	Part I	18UTAG11	Tamil/Hindi I	6	3	25	75
	Part II	18UENG11	English I	6	3	25	75
	Part III	18UCHC11	Core Course -1 Inorganic Chemistry-I	4	4	25	75
		18UCHC12	Core Course - 2 Organic and Physical Chemistry	4	4	25	75
		18UCHC21P	Core Course Practical – I Volumetric Analysis	2	-	-	-
		18UMTA11/ 18UBYA11 18UBYA21P	Allied Course –I Mathematics – I / Allied Botany-I Allied Botany Practical	6/4 2	4 -	25 -	75 -
	Part IV	18UGVE11	Value Education	2	2	40	60
	TOTAL			30	20	600	

Semester	Course Code	Courses	Hours per week	Credits	Total Marks		
					Int.	Ext.	
II	Part I	18UTAG21	Tamil /Hindi II	6	3	25	75
	Part II	18UENG21	English II	6	3	25	75
	Part III	18UCHC21	Core Course - 3 Organic Chemistry-I	4	4	25	75
		18UCHC22	Core Course - 4 Inorganic and Physical Chemistry	4	4	25	75
		18UCHC21P	Core Course Practical –I Volumetric Analysis	2	2	40	60
		18UMTA21/ 18UBYA21	Allied Course – Allied Mathematics - II / Allied Botany-II	3 /4	3/4	25	75
		18UMTA22/ 18UBYA21P	Allied Mathematics – III / Allied Botany Practicals	3/2	3/2	25/40	75/60
	Part IV	18UCHS21	SEC -1 Polymer Chemistry	2	2	25	75
	TOTAL			30	24	800	

Semester	Course Code	Courses	Hours per week	Credits	Total Marks			
					Int.	Ext.		
III	Part I	18UTAG31	Tamil/ Hindi III	6	3	25	75	
	Part II	18UENG31	English III	6	3	25	75	
	Part III	18UCHC31	Core Course -5 Inorganic, Organic and Physical Chemistry-I	5	5	25	75	
		18UCHC41P	Core Course Practical – 2 Inorganic Semi-micro Qualitative Analysis	2	-	-	-	
		18UPHA31 18UPHA41P	Allied-Course -II Allied Physics Allied Physics Practical	4 2	4 -	25 -	75 -	
	Part IV	18UCHS31	SEC -2 Food Chemistry	2	2	40	60	
		18UCHN31	NMEC-1 Industrial Chemistry-I	2	2	40	60	
	Part IV	18UGHR31/ 18UGWS32	Generic Elective -1 1.Human Rights/ 2. Women studies	0	1	40	60	
		18UGEC41/ 18UGEM42/ 18UGEA43/ 18UGED44	Generic Elective -2 Constitution of India/ Modern Economics/ Adolescent Psychology/ Disaster Management	1	-	-	-	
		TOTAL			30	20	700	

Semester	Course Code	Courses	Hours per week	Credits	Total Marks		
					Int.	Ext.	
IV	Part I	18UTAG41	Tamil /Hindi IV	6	3	25	75
	Part II	18UENG41	English IV	6	3	25	75
	Part III	18UCHC41	Core Course - 6 Inorganic, Organic and Physical Chemistry-II	5	5	25	75
		18UCHC41P	Core Course Practical –2 Inorganic Semi -micro Qualitative Analysis	2	2	40	60
		18UPHA41 18UPHA41P	Allied Course – II Allied Physics Allied Physics Practical	4 2	4 2	25 40	75 60
	Part IV	18UCHS41	SEC -3 Leather Chemistry	2	2	40	60
		18UCHN41	NMEC-2 Industrial Chemistry-II	2	2	40	60
		18UCHI41G	Internship/Field Project	0	1	100	-
			Generic Elective -2				
		18UGEC41/	Constitution of India/	1	1	40	60
		18UGEM42/	Modern Economics/				
		18UGEA43/	Adolescent Psychology/				
	18UGED44	Disaster Management					
	Part V		Extension Activities	-	1	-	
			TOTAL	30	26	1000	

Semester	Course Code	Courses	Hours per week	Credits	Total Marks		
					Int.	Ext.	
V	Part III	18UCHC51	Core Course – 7 Organic Chemistry-II	4	4	25	75
		18UCHC52	Core Course - 8 Physical Chemistry-I	4	4	25	75
		18UCHC53	Core Course – 9 Inorganic Chemistry-II	4	4	25	75
		18UCHC61P	Core Course Practical - 3 Gravimetric Analysis and Organic Preparation	3	-	-	-
		18UCHC62P	Core Course Practical - 4 Organic Analysis and Estimation	3	-	-	-
		18UCHC63P	Core Course Practical -5 Physical Chemistry Experiments	2	-	-	-
		18UCHE51	DSEC -1 1.Analytical Methods and Introduction to Computers/ 2.Nanotechnology	4	4	25	75
		18UCHE52					
			18UCHO51	Online Assessment	-	1	50
	Part IV	18UCHS51P	SEC -4 Analysis of Oils/Fats & Water Practical	2	2	40	60
		18UCHS52	SEC -5 Dairy Chemistry	2	2	40	60
		18UGES51	Environmental Studies	2	2	40	60
			TOTAL	30	23	750	

Semester	Course Code	Courses	Hours per week	Credits	Total Marks		
					Int.	Ext.	
VI	Part III	18UHC61	Core Course -10 Organic Chemistry-III	5	4	25	75
		18UHC62	Core Course -11 Physical Chemistry-II	5	4	25	75
		18UHC63	Core Course -12 Applied Chemistry	5	4	25	75
		18UHC61P	Core Course Practical - 3 Gravimetric Analysis and Organic Preparation	3	3	40	60
		18UHC62P	Core Course Practical - 4 Organic Analysis and Estimation	3	3	40	60
		18UHC63P	Core Course Practical -5 Physical Chemistry Experiments	2	2	40	60
		18UCHE61 18UCHE62	DSEC -2 1.Medicinal Chemistry / 2.Industrial Chemistry	5	4	25	75
		18UCHO61	Online Assessment	-	1	50	
		Part IV	18UCHS61	SEC -6 Green Chemistry	2	2	40
	TOTAL			30	27	850	



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VIRUDHUNAGAR - 626 001

B.Sc. CHEMISTRY (SEMESTER)

(2018 -19 onwards)

Semester I	INORGANIC CHEMISTRY-I	Hours/Week: 4	
Core Course-1		Credits: 4	
Course Code 18UCHC11		Internal 25	External 75

COURSE OUTCOME

On completion of the course, the students shall be able

- ❖ To understand about hydrogen, hydrogen peroxide, ozone and water
- ❖ To know about long form of the periodic table & periodicity of properties.
- ❖ To gain knowledge of Group IA, IIA and III A elements and their compounds.
- ❖ To understand about the principles of hybridization and shapes of the molecules.
- ❖ To learn and analyse the bonding characteristics in compounds.
- ❖ To give theoretical knowledge about hydrogen bonding and redox reactions.

UNIT I

Periodic table

Long form of the periodic table, characteristics – classification of elements on the basis of electronic configuration. Periodicity of properties –cause of periodicity- factors influencing the periodicity of properties – Ionisation energy, electron affinity, electronegativity, atomic radius and ionic radius - shielding effect and its application- effective nuclear charge- Slater's rules, variation of screening constant (σ) in the periodic table. (12 Hours)

UNIT II

Chemical bonding

a) Covalent bond - VB approach – types of overlapping – sigma and pi bonds- principles of hybridization- sp, sp^2, sp^3, sp^3d and sp^3d^2 hybridisation with an example. VSEPR theory

–simple Inorganic molecules [BeCl_2 , BF_3 , CH_4 , PCl_5 , NH_3 , & H_2O]. MO Theory – Bonding and Antibonding Orbitals – Application of MO Theory to H_2 , He_2 , N_2 , CO – Comparison of VB and MO Theories.

b) Ionic bond : Lattice energy of NaCl – Born Haber Cycle. (12 Hours)

UNIT III

a) Metallic bond- nature -explanation of properties of metallic bond- conditions for the formation of the metallic bond – Hydrogen bond - types of hydrogen bond –effects of hydrogen bonding – van der Waals forces – types – factors affecting the strength of van der Waal's forces –applications.

b) Oxidation - Reduction : Modern concept – Oxidation number – calculation of oxidation number – Redox reactions – Oxidising agents – reducing agents – auto-oxidation – balancing redox equations by oxidation number and ion-electron methods. (12 Hours)

UNIT IV

a) **Hydrogen:** Position of hydrogen in the periodic table - isotopes of hydrogen – preparation and uses of occluded hydrogen, nascent hydrogen- Hydrides – classification .

b) **Hydrogen peroxide:** Manufacture, properties, and structure- different terms used in expressing the strength of H_2O_2 .

c) **Ozone:** commercial preparation, properties, uses, structure

d) **Water:** Hard and soft water - water softening methods. (12 Hours)

UNIT V

a) **Group I A elements:**

Diagonal relationship of Li and Mg – comparison of Li with other members of the family – Extraction, properties and uses of Li. Compounds of Lithium –chloride & carbonate.

b) Group II A elements:

Beryllium– Diagonal relationship with Al-comparison of Be & Mg with other alkaline earth metals - Extraction of Be from Beryl- uses of Be.

c) Group III A elements:

Diagonal relationship between B and Si – preparation , properties and structure of diborane and borazole. (12 Hours)

TEXT BOOKS

1. Madan. R.D, *Modern Inorganic Chemistry*, S.Chand & Company Ltd.
2. Soni P.L (2008) *Text book of Inorganic Chemistry*, Sultan Chand & Sons, Latest Edition.

REFERENCE BOOK

1. Puri, Sharma, Kalia,(2008) *Principles of Inorganic Chemistry*, Milestone Publishers.
2. Satya Prakash, Tuli G.D., Basu, Madan R.D. (2011), *Advanced Inorganic chemistry*, S.Chand & Company.,Ltd, First Edition.



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B.Sc. CHEMISTRY (SEMESTER)

(2018 -19 onwards)

Semester I	ORGANIC AND PHYSICAL CHEMISTRY	Hours/Week: 4	
Core Course-2		Credits: 4	
Course Code 18UCHC12		Internal 25	External 75

COURSE OUTCOME

On completion of the course, the students shall be able

- ❖ To gain information about the detection of organic compounds.
- ❖ To understand the importance of electronic effects in deciding the mechanism of organic reactions.
- ❖ To enrich the young minds with knowledge on the nomenclature of organic compounds.
- ❖ To understand the chemistry of aliphatic hydrocarbons, the basic building block of organic compounds.
- ❖ To know about the behavior of gases and the laws governing the gaseous system.
- ❖ To understand the various types of velocities and the relationship between them.
- ❖ To know about the various classifications of colloidal system.
- ❖ To have knowledge on the properties and applications of colloids.

UNIT I: Basic concepts in organic chemistry

a) Detection of elements-nitrogen, sulphur and halogens- Determination of molecular weight- Silver salt method, Platinichloride method – Determination of empirical formula and molecular formula.

b) Naming of aliphatic compounds (upto 10 Carbon Systems)

c) Structural isomerism – Chain isomerism, position isomerism, functional isomerism and metamerism.

d) Electron displacement effects: Inductive effect, mesomeric and electromeric effect, resonance – steric inhibition of resonance and hyper conjugative effect. (12 Hours)

UNIT II: Reaction intermediates and aliphatic hydrocarbons

a) Cleavage of bonds : Homolytic and Heterolytic cleavage - reaction intermediates- carbocations, carbanions and free radicals – Formation, structure and their stability - Electrophilic and Nucleophilic reagents-types of organic reactions(elementary idea only).

b) Alkanes: Cracking and pyrolysis.

c) Alkenes: Preparation by dehydrohalogenation of alkyl bromides–

Electrophilic addition reactions– Markownikoff’s rule–peroxide effect.

d) Dienes: Classification- Butadiene – Diels–Alder reaction with mechanism.

e) Alkynes: Acidity of acetylene. (12 Hours)

UNIT III: Gaseous State-I

a) Postulates of kinetic theory of gases – Derivation of ideal gas laws from kinetic gas equation – Deviations- van der Waal’s equation – equation of state – Clausius, Berthelot and Dieterici equations of state – law of corresponding states – compressibility factor for gases – Boyle and inversion temperature of gases.

b) PV isotherm of real and ideal gases – Andrew’s experiments – Critical state of gases – definition and determination of critical constants – relation between critical constants and van der Waal’s constants. (12 Hours)

UNIT IV: Gaseous State-II

a) Maxwell-Boltzmann law of distribution of velocities (Derivation not necessary) - graphical representation - effect of temperature on various velocities – experimental verification of Maxwell’s law.

b) Mean free path - collision number – Brownian movement and determination of Avagadro number – Loschmidt number – principle of equipartition of energy. (12 Hours)

UNIT V: Colloids

a) Colloids- Definition – dispersed phase and dispersion medium - Classification.

b) Solid in liquid (sol) – kinetic, optical and electrical properties – stability of colloids and protective action – Hardy-Schulze law – gold number - Hofmeister series.

- c) Liquid in liquid (Emulsion) – types of emulsion – emulsifier with suitable examples.
- d) Liquid in solid (Gel) – Classification – preparation – properties – thixotropy – syneresis and imbibition – Donnan membrane equilibrium- applications of colloid.

(12 Hours)

TEXT BOOKS

1. Arun Bahl & Bahl B.S., *Advanced Organic Chemistry –19th edition*, S.Chand & Company Ltd.
2. Arun Bahl, Bahl B.S &.Tuli G.D, (2009) *Essentials of Physical chemistry*, S.Chand & Company Ltd., New Delhi.

REFERENCE BOOKS

1. Tewari K.S &.Vishnoi N.K, *A Text book of Organic Chemistry- 3rd edition*, Vikas Publishing House Pvt. Ltd.
2. Finar I.L -Volume I, *Organic Chemistry - 6th edition*, Pearson Education (Singapore) Pvt. Ltd.
3. Soni P.L, (2008), *Text Book of Physical Chemistry*, Sultan Chand & Sons, Latest Edition.
4. Negi A.S. & Anand S.C., *A text book of Physical Chemistry*, A New Age International Publishers, second edition.
5. Puri, Sharma, Pathania, *Elements of Physical Chemistry*, Vishal Publishing & Co, Jalandhar, Delhi, IV Edition.

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Semester I	VALUE EDUCATION (2018 -19 onwards)	Hours/Week: 2	
Ability Enhancement Compulsory Course		Credits: 2	
Course Code 18UGVE11		Internal 100	External -

COURSE OUTCOMES

On completion of the course, the students will be able to

- instill moral values of life in mind of students
- realize potential of human being and glory of human life
- be aware of Indian culture and heritage
- be aware of their rights as women and thereby enabling them to meet the challenges of life.

UNIT I: Values of Life

Introduction - Definition of Values - Significance of Values - Classification of Values – Need for Value Education.

UNIT II: Values for Individual Welfare

Honesty and Integrity- Punctuality- Positive Thinking - Commitment at the Workplace.

UNIT III: Values for Familial Welfare/Peace

Respect and Love for Elders – Truthfulness- Harmonious Relationship – Hospitality.

UNIT IV: Values for Social Welfare/Prosperity

Patriotism and Non-Violence-Human Rights-Women's Rights.

UNIT V: Values for Spiritual Welfare/Well being

Faith in God- Meditation- Purity- Self Surrender.

BOOK PRESCRIBED

Maithili.B & Thilakam.C., *et al.* (2014) . *Value Education*. Chennai: New Century Book House (P) Ltd.



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VIRUDHUNAGAR - 626 001

B.Sc. CHEMISTRY (SEMESTER)

(2018 -19 Onwards)

Semester II	ORGANIC CHEMISTRY-I	Hours/Week: 4	
Core Course Practical I		Credits: 4	
Course Code 18UCHC21		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students shall be able

- ❖ To study the versatility of halogen substituted aliphatic compounds.
- ❖ To establish the synthetic utility of organometallic compounds
- ❖ To gain knowledge of chemistry of hydroxyl group in aliphatic systems
- ❖ To understand the chemistry of aliphatic ethers.
- ❖ To focus special attention on the importance of thio alcohols, thio ethers and phosphorus ylides in Organic synthesis
- ❖ To explore the chemistry and applications of aliphatic carbonyl compounds

UNIT I: Aliphatic halogen compounds

a) Halogen derivatives: Detailed mechanism of aliphatic substitution reactions – S_N1 , S_N2 & S_Ni mechanisms – Elimination - E_1 , E_2 and E_1CB mechanisms – Hofmann and Saytzeff rule – relative reactivity of alkyl halides.

b) Polyhalogen derivatives: Preparation and uses of chloroform, iodoform, carbon tetrachloride - chlorofluorocarbons – Westron and Freon.

c) Halogen derivatives of Unsaturated hydrocarbons: Vinyl chloride, Allyl Iodide - preparation and properties.

d) Organometallic compounds–Grignard reagents – preparation, structure, synthetic applications & limitations -organozinc compounds – applications - organolithium compounds - preparation & applications – organolead compounds. (12 Hours)

UNIT II: Aliphatic alcohols

a) Classification-Ascending and descending the series of alcohols – Rectification of alcohol – absolute alcohol, methylated spirit & power alcohol-Unsaturated alcohols - preparation, properties and uses of allyl alcohol.

Dihydric alcohol: Ethylene glycol – Industrial preparation - properties – oxidation and dehydration reactions and uses.

Trihydric alcohol: Glycerol – estimation of number of hydroxyl groups.

b) Ethers: Classification – estimation of alkoxy groups.

c) Thioalcohols and Thioethers: Preparation of ethyl mercaptan, sulphonal and mustard gas.

d) Phosphorus Ylides: Preparation, Properties – Wittig reaction. (12 Hours)

UNIT III: Aliphatic aldehydes and ketones

Electronic structure of carbonyl group – preparation of aldehydes and ketones from fatty acids – Rosenmund reaction – Stephen’s method- Mechanism of Nucleophilic addition to carbonyl compounds – hemiacetal and acetal formation – cyanohydrin formation – nucleophilic hydride ion transfer - Meerwein-Ponndorf-Verley reduction – Oppenauer oxidation – Relative reactivities of aldehydes and ketones - Chemistry of acrolein and crotonaldehyde – chloral – glycolaldehydes – hydroxy acetone – glyoxal and acetylacetone (12 Hours)

UNIT IV: Aliphatic carboxylic acids and their derivatives

a) Structure of carboxylic group – acidity of carboxylic acids – effect of substituents on acidity – Higher fatty acids – Palmitic acid and stearic acid–unsaturated monocarboxylic acids – chemistry of acrylic acid and oleic acid.

b) Dicarboxylic acids: Preparation and properties of malonic acid- Blanc’s rule -action of heat on dicarboxylic acids.

c) Unsaturated dicarboxylic acids: Preparation and properties of maleic acid and fumaric acid.

d) Preparation and properties of acetyl chloride – acetic anhydride – acetamide.

e) Esters: Distinction between ester and salts – esterification and ester hydrolysis – detailed mechanism of acid and base catalysed hydrolysis of ester- synthetic applications of malonic ester. (12 Hours)

UNIT V: Substituted carboxylic acids

- a) Hydroxy acids: Preparation and properties of glycollic, lactic, malic, citric and tartaric acids – action of heat on hydroxy acids.
- b) Halogen substituted acids: Preparation and properties of monochloro, dichloro and trichloro acetic acids.
- c) Aldehydic and ketonic acids: Preparation and properties of glyoxylic acid, pyruvic acid, acetoacetic acid and laevulic acid. Preparation and Synthetic applications of acetoacetic ester. (12 Hours)

TEXT BOOKS

1. Soni P.L. & Chawla H.M., *Text Book of Organic Chemistry* –29th edition, Sultan Chand & Sons.
2. Arun Bahl & Bahl B.S., *Advanced Organic Chemistry* –19th edition, S.Chand & Company Ltd.

REFERENCE BOOKS

1. Tewari K.S. & Vishnoi N.K., *A Text book of Organic Chemistry*, 3rd edition, Vikas Publishing House Pvt. Ltd.
2. Finar I.L., Volume I, *Organic Chemistry*, 6th edition, Pearson Education (Singapore) Pvt. Ltd.



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VIRUDHUNAGAR - 626 001

B.Sc. CHEMISTRY (SEMESTER)

(2018 -19 onwards)

Semester II	INORGANIC AND PHYSICAL CHEMISTRY	Hours/Week: 4	
Core Course -3		Credits: 4	
Course Code 18UCHC22		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students shall be able

- ❖ To understand the principles of metallurgy & extraction of metals.
- ❖ To gain knowledge of Group IVA and VA elements, compounds and their applications
- ❖ To acquire knowledge on halogens and noble gases.
- ❖ To know about the nature of cohesive forces in liquids
- ❖ To understand the physical properties and chemical constitution of liquids
- ❖ To know about magnetic moment and magnetic susceptibility.
- ❖ To know about the characteristics of adsorption and catalysis.

UNIT I: Metallurgy

a) Occurrence of metals – concentration of ores – froth-floatation process, magnetic separation, calcination, roasting, smelting – flux - slag- purification of metals – Aluminothermic process – Electrolytic refining- Zone refining –Van Arkel–de Boer process.

b) Important ores and extraction of the following metals – Ti, Th, U, V and Mo- their important alloys and applications.

c) Preparation and uses of some important compounds - titanium oxide, thorium oxide, ammonium molybdate (analytical use), vanadium pentoxide, sodium cobaltinitrite, chloroplatinic acid, uranium hexafluoride, uranyl acetate, thorium nitrate and ceric ammonium nitrate. (12 Hours)

UNIT II

- a) General characteristics of elements of Group IV A – Difference of carbon and silicon from the rest of the family – C_{60} fullerenes – uses. Preparation, properties and uses of silicon carbide, silicon tetrafluoride, permono and perdicarbonic acid.
- b) General characteristics of elements of group VA – Active nitrogen –preparation, properties and uses of hydrazine, hydroxylamine, hydrazoic acid, hyponitrous acid and nitramide.
- c) Classification of oxides with examples - Preparation, properties and structure of permono and perdisulphuric acid. (12 Hours)

UNIT III

- a) Halogens:
- i) Isolation of fluorine – Deniss method , Moissans method, difficulties in the isolation of fluorine – manufacture of fluorine – Modern method – peculiarities of fluorine.
- ii) Chlorine - bleaching powder- estimation of available chlorine in bleaching powder - preparation, structure, properties and uses of perchloric acid and potassium perchlorate.
- iii) Bromine – Brominating mixture.
- iv) Iodine - Periodic acid & basic iodine.
- v) Interhalogen compounds, polyhalides & pseudohalogens.
- b) Position of noble gas in the periodic table – Preparation, properties and structure of Xenon compounds – XeF_2 , XeF_4 , XeF_6 , XeO_3 - clathrates of noble gases (Brief study only). (12 Hours)

UNIT IV: Liquid state

- a) Nature of cohesive forces in liquids – Trouton’s rule and its significance.
- b) Physical properties and chemical constitution
- i. Surface tension – Parachor and its applications
- ii. Viscosity – application to chemical constitution – Rheochor
- iii Refractive index – optical exaltation
- iv. Dipole moment – definition –electrical polarization of molecule – Clausius Mosotti equation – Debye equation – experimental determination – various applications.

- v. Magnetic moment – magnetic susceptibility – para,dia and ferro magnetism – specific, molar magnetic susceptibility – determination by Guoy’s method – various applications. (12 Hours)

UNIT V

a) Adsorption: Definition of various terms – characteristics of adsorption of gases on solids – physical adsorption and chemical adsorption – differences between them – factors influencing adsorption – adsorption isotherm – Freundlich & Langmuir adsorption isotherm -BET theory (Elementary idea only) - applications of adsorption.

b) Catalysis: Definition- characteristics – theories of catalysis- promoters and poisons- enzyme catalysis- acid-base catalysis and autocatalysis- applications of catalysis.

(12 Hours)

TEXT BOOKS

1. Satya Prakash, Tuli G.D., Basu, Madan R.D. (2011), *Advanced Inorganic Chemistry*, S.Chand & Company.,Ltd, First Edition.
2. Arun Bahl, Bahl B.S & Tuli G.D., (2009) *Essentials of Physical Chemistry*,S.Chand & Company Ltd., New Delhi, Revised Edition.

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1. Puri, Sharma, Kalia, (2008) *Principles of Inorganic Chemistry*, Milestone Publishers.
2. Soni P.L. (2008) *A Text book of Inorganic Chemistry*, Sultan Chand & Sons, Latest Edition.
3. Madan .R.D, *Modern Inorganic Chemistry*, S.Chand & Company Ltd.
4. Soni P.L (2008)., *Text Book of Physical Chemistry*, Sultan Chand & Sons, Latest Edition.
5. Puri, Sharma, Pathania,*Elements of Physical Chemistry*, Vishal Publishing & Co, Jalandhar, Delhi, IV Edition.



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B.Sc. CHEMISTRY (SEMESTER)

(2018 -19 onwards)

Semester II	POLYMER CHEMISTRY	Hours/Week: 2	
Skill Enhancement Course -1		Credits: 2	
Course Code 18UCHS21		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students shall be able

- ❖ To know about the types of polymers.
- ❖ To understand the chemistry of polymerization.
- ❖ To know about plastics, resins and fibers.
- ❖ To acquire knowledge about the chemistry of inorganic and conducting polymers.
- ❖ To understand the chemistry of natural and synthetic rubber.

UNIT I

Polymers - Introduction - definition - Classification of polymers- Types of polymerization reactions - Addition, condensation polymerization – examples-differences between addition and condensation polymerization. (12Hours)

UNIT II

Plastic - definition - Types - Thermosetting and thermoplastics – differences-examples – advantages and disadvantages of plastics - preparation and uses of cellulose acetate, celluloid, PVC, polyethylene, teflon, polycarbonates and polystyrene. (12Hours)

UNIT III

Resins -Definition - Types – Examples - Phenolic resin, amino resin and polyurethanes – preparation and uses.

Fibres – Nylon-6,6, Nylon-6 and polyester - preparation and uses. (12Hours)

UNIT IV

Inorganic polymers - Silicones - preparation and uses- Glass transition and melting temperatures – importance - conducting polymers - Different types - uses. Polymer alloy - biomedical polymers - examples and uses. (12Hours)

UNIT V

Rubber - Natural rubber - Vulcanization of rubber-synthetic rubber – Buna - S, Buna-N, Thiokol and Neoprene rubber- preparation and uses. (12Hours)

TEXT BOOKS

- 1.Jain & Jain (2013) *Engineering Chemistry*, Dhanpat Rai Publishing Company (P) Ltd, 16th Edition.
- 2.Jayashree Ghosh,(2013), *Fundamental concepts of Applied Chemistry*, S.Chand & Company Ltd.

REFERENCE BOOKS

- 1.K.Bagavathi Sundari,(2006) *Applied Chemistry*, MJP Publishers.
- 2.B.K.Sharma, (2008) *Industrial Chemistry*, GOEL Publishing House, 13th Edition.



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B.Sc. CHEMISTRY (SEMESTER)

(2018 -19 onwards)

Semester I/II	CORE PRACTICAL - I VOLUMETRIC ANALYSIS	Hours/Week: 2	
Core Course Practical -I		Credits: 2	
Course Code 18UCHC21P		Internal 40	External 60

A double titration involving the making up of the solution to be estimated and the preparation of a primary standard

LIST OF EXPERIMENTS

I. ACIDIMETRY AND ALKALIMETRY

1. Estimation of Na_2CO_3
2. Estimation of NaOH / KOH
3. Estimation of oxalic acid.

II. REDOX TITRATIONS

a) Permanganimetry

1. Estimation of ferrous ion
2. Estimation of oxalic acid

b) Dichrometry

Estimation of ferrous ion using external indicator

III. IODOMETRY AND IODIMETRY

1. Estimation of potassium dichromate
2. Estimation of potassium permanganate
3. Estimation of copper
4. Estimation of arsenious oxide.

IV. ARGENTOMETRY

Estimation of KCl

Distribution of Marks

Max. marks – 100 (Ext: 60 , Int: 40)

Record Note book - 10 marks

Procedure - 10 marks

Volumetric estimation - 40 marks

Total = 60 marks

Error	Marks
< 2 %	40
2-3 %	35
3-4 %	30
> 4%	20



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B.Sc. CHEMISTRY (SEMESTER) (2018 -19 onwards)

Semester I	ALLIED PAPER- ORGANIC, INORGANIC AND PHYSICAL CHEMISTRY – I	Hours/Week: 4	
Allied Course -1		Credits: 4	
Course Code 18UCHA11		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students shall be able

- ❖ To get concise information about polymers.
- ❖ To know the basic principles in the processing of ores.
- ❖ To know the bonding characteristics in compounds in a simple manner.
- ❖ To get insight into the basic laws governing the behavior of gases.
- ❖ To gain basic knowledge about colloids.

UNIT I

1. Polymers – Polymerization – Definition – Classification – examples – Preparation and uses of polythene, PVC, teflon, polystyrene, dacron, nylon- 6,6.
2. Natural and synthetic rubbers – examples – vulcanization of rubber- Preparation and uses of SBR, Buna – N and neoprene.
3. Biomedical polymers – characteristics – examples - Biomedical applications of polymer. (12Hours)

UNIT II

1. Metallurgy

Ores, minerals – various steps in the metallurgical processes – Froth floatation – calcination – roasting – leaching – smelting – Mond's process – Van Arkel –de-Boer process – Zone refining – Electrolytic refining – Extraction of titanium.

2. Hydrogen

Isotopes of hydrogen – Heavy water – uses- ortho and para hydrogen
Interconversion. Occluded hydrogen – Nascent hydrogen – uses of hydrogen.

3. Water

Hardness of water – Types of hardness – Removal of hardness – sodalime,
Permutit and Ion-exchange processes - Demineralisation process – purification of water
using chlorine, Ozone and UV light. (12Hours)

UNIT III

1. Bonding – Valence bond theory – postulates – Types of overlapping- σ & π bonds -
Concept of hybridization – sp , sp^2 and sp^3 hybridisation – VSEPR Theory – NH_3 and H_2O
molecules.

2. Molecular orbital theory – postulates – Application to the formation of H_2 , O_2 and He_2
molecules. Comparison of VBT and MOT. (12Hours)

UNIT IV

1. Gas Laws - Boyle's law – Charles law – Gay Lussac's law – Ideal gas equation –
Avogadro's law – molar gas volume – Dalton's law of partial pressure -Graham's law of
diffusion.

2. Kinetic Theory of gases - Postulates – Kinetic gas equation (Derivation not required)
– Deduction of gas laws from kinetic gas equation.

3. Different types of Velocities – Average velocity, RMS velocity, most probable
velocity – relationship between them. (No derivation)

4. Ideal and real gases - Definition – Deviation of real gases from ideal behavior –
reasons for deviation. (12Hours)

UNIT V

1. Colloids – Definition and classification.

2. Sols – Different types – examples –Dialysis – electro osmosis – electrophoresis –
stability of colloids- Gold number.

3. Emulsion – Types of emulsion – Emulsifier – Examples – Cleansing action of soap.
4. Gels – Types of gels – examples – Properties – Hydration – Swelling – syneresis – Thixotropy.
5. Applications of colloids. (12Hours)

TEXT BOOKS

- 1.P.L.Soni, (2008) *Text book of Organic Chemistry*, Sultan Chand & Sons, Latest Edition.
2. P.L.Soni, (2008) *Text book of Inorganic Chemistry*, Sultan Chand & Sons, Latest Edition.
3. P.L.Soni, *Text book of Physical chemistry*, (2008) Sultan Chand & Sons, Latest Edition.

REFERENCE BOOKS

1. Bahl and Arun Bahl, *Advanced Organic Chemistry*, S.Chand & Company Ltd, 22nd Edition.
2. Puri, Sharma, Kalia, *Principles of Inorganic Chemistry*, Vishal Publishing Co, 43rd Edition.
3. Puri, Sharma, Patania, *Principles of Physical Chemistry*, Vishal Publishing Co, 43rd Edition.



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B.Sc. CHEMISTRY (SEMESTER)

(2018 -19 onwards)

Semester II	ALLIED PAPER- ORGANIC, INORGANIC AND PHYSICAL CHEMISTRY – II	Hours/Week: 4	
Allied Course -2		Credits: 4	
Course Code 18UCHA21		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students shall be able

- ❖ To know about oils and fats including their uses in making food and soap.
- ❖ To know about the chemistry of biomolecules such as carbohydrates, aminoacids, proteins and nucleic acids.
- ❖ To gain knowledge about fuels and fertilizers
- ❖ To understand about air, water and radioactive pollutions and their preventive measures.
- ❖ To understand the basic concepts of adsorption phenomenon and catalysis.

UNIT I

1. Oils and Fats – Definition – Properties - Distinction between them -Hydrogenation, Hydrogenolysis, Rancidification and Drying of oils – Preparation of Vanaspathi- Analysis of oils and Fats – Saponification and iodine number. (12Hours)

2. Soaps and Detergents

Soap – Definition – Different types – Manufacture of soap – Kettle process - Detergent – Definition – Synthetic detergents – examples – Distinction between soaps and detergents. (12Hours)

UNIT II

1. Carbohydrates – classification – Differences between glucose and fructose – Inter conversion of glucose and fructose – Haworth structure of glucose and fructose- Differences between starch and cellulose – Derivatives of cellulose and their uses.
2. Amino acids – classification – preparation of α -amino acids– properties – Zwitterion – isoelectric point .
3. Proteins – classification – Biological function – colour reaction of proteins.
4. Nucleic acids – RNA and DNA – Biological functions (Elementary idea only).
(12Hours)

UNIT III

1. Fuels – classification – Advantages of gaseous fuels – constituents and uses of water gas, producer gas, LPG, Gobar gas and natural gas.
2. Fertilizers – classification – Macro and micro nutrients – Functions of nutrients preparation and uses of urea, ammonium sulphate, superphosphate, triple superphosphate, potassium nitrate and NPK.
(12 Hours)

UNIT IV

1. Air pollution – Definition – sources of air pollution –classification and effects of air pollutants – Ozone layer- formation and depletion – Green house effect – Acid rain – Preventive measures of air pollution.
2. Water pollution –types and sources of water pollution –classification and effects of water pollutants-control of water pollution-Desalination of sea water by electro dialysis and reverse osmosis.
3. Radioactive pollution – sources – nuclear waste disposal – Effects of radiations.
(12 Hours)

UNIT V

1. Adsorption – Characteristics – Types of adsorption and comparison – Factors influencing adsorption – Langmuir and Freundlich adsorption isotherm (No derivation) – Applications of adsorption.
2. Catalysts – Characteristics- Different types with examples – Catalytic poisoning – promoters with examples. (12 Hours)

TEXT BOOKS

1. Soni P.L., *Text book of Organic Chemistry*, Sultan Chand & Sons, Latest Edition.
2. Soni P.L., *Text book of Inorganic Chemistry*, Sultan Chand & Sons, Latest Edition.
3. Jayashree Ghosh, *Fundamental Concepts of Applied Chemistry*, S.Chand & Company Ltd.
4. Soni, P.L. *Text book of Physical chemistry*, Sultan Chand & Sons, Latest Edition,

REFERENCE BOOKS

1. Jain M.K.& Sharma S.C., *Modern Organic Chemistry*, Vishal Publishing Co.
2. Sindhu P.S., *Environmental Chemistry*.
3. P.C.Jain & Monika Jain – *Engineering chemistry*, XVI Edition, Dhanpat Rai Publishing Co. New Delhi.
4. Puri ,Sharma, Pathania, *Principles of Physical Chemistry*, 43rd Edition Vishal Publishing Co.



V.V. VANNIAPERUMAL COLLEGE FOR WOMEN

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Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

B.Sc. CHEMISTRY (SEMESTER)

(2018 -19 onwards)

Semester II	VOLUMETRIC ANALYSIS	Hours/Week: 2	
Allied Course Practical -1		Credits: 2	
Course Code 18UCHA21P		Internal 40	External 60

A double titration involving making up of the solution to be estimated or single titration involving making up of the solution to be estimated and the preparation of a primary standard

a. Acidimetry and Alkalimetry:

1. Titration between a strong acid and strong base
2. Titration between a strong acid and weak base.
3. Titration between a weak acid and strong base

b. Permanganimetry:

Titration between potassium permanganate and

- i) oxalic acid ii) ferrous sulphate and iii) ferrous ammonium sulphate (Mohr's salt)

c. Iodometry:

Titration between sodium thiosulphate and i) potassium permanganate and ii) potassium dichromate.

Distribution of Marks:

Max. Marks: 100

Ext: 60

Int: 40

Record Note Book - 10 marks

Procedure - 10 marks

Estimation - 40 marks

Total - 60 marks

Error	Marks
<2%	40
2-3 %	35
3-4%	30
> 4%	20