JAYARAJ ANNAPACKIAM COLLEGE FOR WOMEN (AUTONOMOUS)

A Unit of the Sisters of St. Anne of Tiruchirappalli
Accredited with 'A^{+}' Grade (Cycle 4) by NAAC
DST FIST Supported College
Affiliated to Mother Teresa Women's University, Kodaikanal

PERIYAKULAM – 625 601, THENI DT. TAMIL NADU.

SYLLABUS 2020 - 2023

B. SC. CHEMISTRY

PG AND RESEARCH CENTRE OF CHEMISTRY

U.G. PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario.
2.	Formulate hypothesis, design experiments, use appropriate tools and interpret the results.
3.	Demonstrate the precise understanding of the principles and theories of their discipline through experiments.
4.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
5.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities such as self-esteem, positive attitude, self-discipline, and self-motivation.

U.G. PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Apply knowledge in various aspects of chemistry in fields such as organic, inorganic, physical, analytical, spectral, biochemical and environment	PO-1, PO-2
2.	Exhibit problem solving skills and analytical skills	PO-2, PO-3
3.	Realize the values of chemistry in our daily life and discharge knowledge and skills as analyst in small scale industries, cottage industries and quality control sectors	PO-5, PO-6
4.	Pursue higher education in the field of chemistry and in different horizon of life	PO-4, PO-5
5.	Fix their feet and brighten their career in the field of chemistry for sustainable future and face emerging opportunities and challenges	PO-1, PO-4, PO-6

UG COURSE PATTERN (2020-2023) (UGC/ TANSCHE/ MTU)

Sem.	Part	Code	Title of theCourse	Hours	Credit
I	I	20GT1GS01/ 20GH1GS01/ 20GF1GS01	Tamil-I Hindi-I French-I	6	3
	II	20GE1GS01	English-I	6	3
	III	20CH1MC01	General Concepts in Chemistry-I	6	6
		20CH1CP01	Practical: Semi-micro Inorganic Qualitative Analysis¤	3	-
		20MA1AC01/ 20ZO1AC01	Allied Mathematics-I/ Allied Zoology-I	5/3	4/3
		20ZO1AP01	Allied Zoology Practical-I	2	1
	IV	20CH1AE01	**AbilityEnhancementCompulsory Course (AECC)-1** Professional English	2	2
	IV	20SE1CE1B	**Skill Enhancement Compulsory Course (SECC)-1** Computer Education	2	2
	V	20STPNS01/ 20STPNC01/ 20STPPE01/ 20STPCC01/ 20STPRR01/ 20STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	-
			Total	**30**	**20**
II	I	20GT2GS02/ 20GH2GS02/ 20GF2GS02	Tamil-II Hindi-II French-II	6	3
	II	20GE2GS02	English-II	6	3
	III	20CH2MC02	General concepts in Chemistry-II	6	6
		20CH2CP01	Practical: Semi-micro Inorganic Qualitative Analysis¤	3	3
		20MA2AC02/ 20ZO2AC02	Allied Mathematics-II/ Allied Zoology-II	5/3	4/3
		20ZO2AP02	Allied Zoology-Practical-II	2	1

Sem.	Part	Code	Title of the Course	Hours	Credit
II	IV	20AE2ES02	**Ability Enhancement Compulsory Course (AECC)-2:** Environmental Studies	2	2
	IV	20SE2CB02	**Skill Enhancement Compulsory Course (SECC)- 2:** Capacity Building	2	2
	V	20STPNS01/ 20STPNC01/ 20STPPE01/ 20STPCC01/ 20STPRR01/ 20STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	-
			Total	**30**	**23**
III	I	20GT3GS03 20GH3GS03 20GF3GS03	Tamil-III Hindi-III French-III	6	3
	II	20GE3GS03	English-III	6	6
	III	20CH3MC03	Inorganic and Organic Chemistry	6	6
		20CH3CP02	Practical: Microscale Analysis of Organic Substances	3	2
		20PH3AC01	Allied Physics-Theory	3	3
		20PH3AP01	Allied Physics-Lab	2	1
		20CH3DE1A/ 20CH3DE1B/ 20CH3DE1C	**Discipline Specific Elective-1** Electrochemistry/ Dairy Chemistry/ Soil and Agriculture Chemistry	4	3
	V	20STPNS01/ 20STPNC01/ 20STPPE01/ 20STPCC01/ 20STPRR01/ 20STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	-
			Total	**30**	**21**

Sem.	Part	Code	Title of the Course	Hours	Credit
IV		20GT4GS04/ 20GH4GS04/ 20GF4GS04	Tamil-IV Hindi-IV French-IV	6	3
	I	20GE4GS04	English-IV	6	3
	II	20CH4MC04	Organic and Physical Chemistry	6	6
	III	20CH4CP03	Practical: Volumetric Analysis	3	2
		20PH4AC02	Allied Physics-Theory	3	3
		20PH4AP02	Allied Physics-Lab	2	1
		20CH4DE2A/ 20CH4DE2B/ 20CH4DE2C	**Discipline Specific Elective-2** Heterocyclic Chemistry / Fuel Chemistry/ Supramolecular Chemistry	4	3
	V	20STPNS01/ 20STPNC01/ 20STPPE01/ 20STPCC01/ 20STPRR01/ 20STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	2*
	V	20SLPEX01	**Service Learning Programme:** Extension JACEP	-	-
			Total	**30**	**21+2***
V	III	20CH5MC05	Organic Chemistry-I	6	6
		20CH5MC06	Physical Chemistry-I	6	6
		20CH5MC07	Inorganic Chemistry-I	5	5
		20CH5CP04	Practical: Physical Chemistry	5	3
		20CH5DE3A/ 20CH5DE3B/ 20CH5DE3C	**Discipline Specific Elective-3** Analytical Chemistry/ Molecules of Life/ Food Processing Chemistry	4	3
		20CH5GE01/ 20GE5NC01	**Generic Elective-1 (NME)** Applied Chemistry/ NCC-National Integration and Personality Development	2	2

Sem.	Part	Code	Title of the Course	Hours	Credit
	IV	20SE5AB03	**Skill Enhancement Compulsory Course (SECC)-3:** Aptitude Building - I	2	2
	V	20SLPEX01	**Service Learning Programme:** Extension JACEP	-	2*
			Total	**30**	**27+2***
VI	III	20CH6MC08	Organic Chemistry-II	6	6
		20CH6MC09	Physical Chemistry-II	6	6
		20CH6MC10	Inorganic Chemistry-II	5 + 1#	6
		20CH6CP05	Practical: Inorganic Preparation and Gravimetric Estimation	4	2
		20CH6DE4A/ 20CH6DE4B/ 20CH6DE4C	**Discipline Specific Elective-4** Spectroscopy and its Applications to Chemistry/ Nano Chemistry/ Applied Electrochemistry	4	3
		20CH6GE02/ 20GE6NC02	**Generic Elective-2 (NME)** Usage of Chemicals in Daily Life/ NCC-Organization and Health Programme in NCC	2	2
		20CH6PR01	Group Project	1+1#	1
	IV	20SE6CH04	**Skill Enhancement Compulsory Course (SECC) 4:** Entrepreneurship Skills in Chemistry	2	2
	IV	20CH6SS01/ 20CH6SS02/ 20CH6SS03/ 20CH6SS04/ 20CH6SM01	**Self Study Course:** Principles and Applications of Green Chemistry/ Herbal Chemistry/ Energy for future/ Polymer Chemistry/ MOOCs	-	2*
			Total	**30 + 1#**	**28+2***
			Total	**180**	**140+6***

¤ Credits will be awarded in II semester

*** Extra Credits**

 # Outside the class hours

ALLIED COURSES OFFERED BY THE DEPARTMENT FOR

I B.Sc. ZOOLOGY (R+SF)

Sem.	Part	Code	Title of the Paper	Hours	Credit
I	III	20CH1AC01	Allied Chemistry-I	3	3
	III	20CH1AP01	Allied Practical-I: Volumetric Analysis	2	1
II	III	20CH2AC02	Allied Chemistry-II	3	3
	III	20CH2AP02	Allied Practical-II: Organic Analysis	2	1

FOR II B.Sc. PHYSICS (R+SF)

Sem.	Part	Code	Title of the Paper	Hours	Credit
III	III	20CH3AC01	Allied: General Chemistry-I	3	3
	III	20CH3AP01	Allied Practical-I: Organic Analysis	2	1
IV	III	20CH4AC02	Allied: General Chemistry-II	3	3
	III	20CH4AP02	Allied Practical-II: Volumetric Analysis	2	1

SKILL DEVELOPMENT PROGRAMME (SDP)

CERTIFICATE COURSE (NON SEMESTER)

Code	Title of the Course	Hours	Credit
20CH1SD01	IT skills for Chemists	60	2

DIPLOMA COURSE (NON SEMESTER)

Code	Title of the Course	Hours	Credit
DCCHMC01	Chemistry of Modern Cosmetics	2	2
DCCHMCP1	Practical: Handling Cosmetics Lab-I	2	1
DCCHMCP2	Practical: Handling Cosmetics Lab-II	2	1
		6	4
Total number of hours = 30 weeks x 6 = 180 Hours			

QUESTION PATTERN

B.Sc. Chemistry and Chemistry Allied for II B.Sc. Physics (R & SF)

Blue print of question paper (Internal and External)

Continuous Internal Assessment Component (CIA)

Theory:

Component	Marks	Marks
Internal test I	40	Converted to 25
Internal test II	40	
Quiz	10	
Assignment	5	
Attendance	5	
Total	**100**	**25**

GROUP PROJECT (only Internal)

Maximum 5 students / group

THE INTERNAL COMPONENTS OF PROJECT WORK- MAXIMUM 100 MARKS

Components	Marks
First review	20
Second review	20
Report submission	20
Final review (Internal viva voce)	40
Total	**100**

PRACTICAL:

Continuous Internal Assessment Component (CIA) - 40 Marks

External Practical Exam - 60 Marks

Passing Minimum in the Continuous Internal Assessment is Compulsory for appearing the External Semester Examination

Passing Minimum for CIA Examination	
Theory	40% out of 25 Marks (i.e. 10 Marks)

Passing Minimum for Semester Examination	
Theory	40% out of 75 Marks (i.e. 30 Marks)
Practical	40% out of 60 Marks (i.e. 24 Marks)

INTERNAL QUESTION PATTERN

(Max: 40 Marks)

PART - A

10 Questions (MCQ) × 1Mark =10 Marks

PART - B

2 Questions × 5 Marks = 10 Marks (Internal Choice)

PART - C

2 Questions × 10 Marks = 20 Marks (2 Questions out of 3)

(Open Choice and atleast one Question from allotted Units)

EXTERNAL QUESTION PATTERN

(Max: 75 Marks)

PART - A

10 Questions × 1Mark = 10 Marks

(Two Questions from each Unit)

PART - B

5 Questions × 5 Marks = 25 Marks

(Internal Choice and one set of Question from each Unit**)**

PART - C

4 Questions × 10 Marks = 40 Marks (4 Questions out of 6)

(Open Choice and at least one Question from each Unit)

SELF STUDY COURSE

(External evaluation)

Time: 3 hours **Max. Marks: 100**

PART	Types of Question	Number of Qns.	Number of Qns. to be answered	Marks for each Qn.	Total
A Q. No (1-10)	Two questions from each unit	10	10	2	**20**
B Q. No (11-17)	Open choice-minimum one question should be from each unit	7	5	7	**35**
C Q. No (18-22)	Open choice-minimum one question should be from each unit	5	3	15	**45**

PART – I Tamil - இக்கால இலக்கியம்

பருவம்: ஒன்று **நேரம்: 6**

குறியீடு: 20GT1GS01 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	இக்கால இலக்கியக் கவிஞர்களைப் பற்றி அறிந்து கொள்வர்.	PSO - 1	ஆற்றல், புரிதல்
CO-2	இலக்கிய வரலாற்றை அறிந்து கொள்வர்	PSO - 1	புரிதல், பயன்படுத்துதல்
CO-3	வாழ்க்கையில் ஏற்படும் துன்பங்களை அகற்றி, வெற்றி பெறும் வழிமுறைகளைத் தெரிந்து கொள்வர்.	PSO - 5	ஆற்றல், மதிப்பீடு
CO-4	கட்டுரைகள் வழி பன்முகத் தகவல்களை அறிந்து கொள்வர்.	PSO - 1	பயன்படுத்துதல், அறிவு
CO-5	எழுத்து இலக்கணங்களை அறிந்து கொள்வர்.	PSO - 2	புரிதல், அறிவு

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I			**PART - I Tamil - இக்கால இலக்கியம்**							**Hours: 6**
Code : 20GT1GS01										**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**			**Mean Score of CO_S**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	2	4	5	3	4	5	5	3	2	3.83
CO - 2	4	4	5	4	3	5	5	3	2	5	2	3.83
CO - 3	4	5	4	2	5	3	4	5	5	2	3	3.83
CO - 4	5	3	5	2	4	5	3	2	4	5	4	3.83
CO - 5	5	5	4	5	4	3	2	4	5	3	2	3.83
Overall Means Score												**3.83**

Result: The Score of this Course is **3.83** (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

அலகு1: மரபுக் கவிதைகள்

1. பாரதியார் - நிலாவும் வான்மீனும் காற்றும் (மனத்தை வாழ்த்துதல்)
2. பாரதிதாசன் - வள்ளுவர் வழங்கிய முத்துக்கள்
3. கவிமணி தேசிக விநாயகம் பிள்ளை - உடல்நலம் பேணல்
4. கவியரசு கண்ணதாசன் - அனுபவமே கடவுள்
5. முடியரசன் - யார் கவிஞன்?

அலகு2: புதுக்கவிதை

1. ந. பிச்சமூர்த்தி - ஆத்தூரான் மூட்டை
2. நா. காமராசன் - காகிதப்பூக்கள்
3. அப்துல் ரகுமான் - ஆறாவது அறிவு
4. கவிஞர் பாலா - வானம் வசப்படும்
5. நெல்லை ஜெயந்தா - தொப்புள் கொடி

அலகு3: சிறுகதை

வெ. இறையன்பு - அழகோ அழகு

அலகு4: கட்டுரைத் தொகுப்பு

சிவசூரியன் இ.ஆ.ப., - நிறைவாக வாழுங்கள்

அலகு5: இலக்கணம், இலக்கிய வரலாறு

1. இலக்கணம்: - எழுத்தும், சொல்லும்
   எழுத்து - முதலெழுத்து, சார்பெழுத்து
   சொல் - பெயர்ச்சொல், வினைச்சொல், இடைச்சொல், உரிச்சொல்
2. கி. இராஜா - தமிழ் இலக்கிய வரலாறு
   (இக்கால இலக்கியம், மரபுக்கவிதை, புதுக்கவிதை, உரைநடை தொடர்பான இலக்கிய வரலாறு)

பாடநூல்கள்:

1. தமிழ்த்துறை வெளியீடு - இக்கால இலக்கியம்
   ஜெயராஜ் அன்னபாக்கியம் மகளிர் தன்னாட்சிக் கல்லூரி
   பெரியகுளம்
2. வெ. இறையன்பு - அழகோ அழகு
   நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்,
   41-டீ சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,
   அம்பத்தூர், சென்னை – 98
   4ஆம் பதிப்பு – 2013.
3. சிவசூரியன் இ.ஆ.ப., - நிறைவாக வாழுங்கள்
   நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்,
   41-டீ சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,
   அம்பத்தூர், சென்னை – 98
   மு.பதிப்பு – 2017.
4. கி. இராஜா - தமிழ் இலக்கிய வரலாறு
   நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்,
   41-டீ சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,
   அம்பத்தூர், சென்னை – 98
   இரண்டாம் பதிப்பு – 2019.

ENGLISH FOR COMMUNICATION -I

Semester: I **Hours: 6**
Code : 20GE1GS01 **Credits: 3**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Develop a fair degree of competence in self-expression in both writing and speaking.	PSO-1	K, AP
CO - 2	Read and comprehend texts.	PSO-1 ,PSO-2	C, AP
CO - 3	Use academic resources.	PSO-3	AP
CO - 4	Engage in independent learning.	PSO-3	A, S, E
CO - 5	Obtain critical and analytical thinking.	PSO-5	AP, S, E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester : I				**ENGLISH FOR COMMUNICATION -I**							**Hours: 6**
Code : 20GE1GS01											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of COs**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO-1	4	5	3	4	5	4	4	3	5	5	5	4.27
CO-2	3	5	4	4	5	5	3	3	4	4	5	4.09
CO-3	3	5	4	3	3	3	3	4	3	3	5	3.54
CO-4	3	5	3	4	3	3	3	4	4	3	5	3.63
CO-5	5	5	4	3	5	5	3	5	4	5	5	4.45
Overall Mean Score												**3.99**

Result: The score for this course is 3.99 (High Relationship)
Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

UNIT I **20 Hours**

1. Listening and Speaking
   a. Introducing self and others
   b. Listening for specific information
   c. Pronunciation (without phonetic symbols)
      i. Essentials of pronunciation
      ii. American and British pronunciation
2. Reading and Writing
   a. Reading short articles - newspaper reports / fact based articles
      i. Skimming and scanning
      ii. Diction and tone
      iii. Identifying topic sentences
   b. Reading aloud: Reading an article/report
   c. Journal (Diary) Writing
3. Study Skills - I
   a. Using dictionaries, encyclopedias, thesaurus
4. Grammar in Context

   Naming and Describing
   - Nouns and Pronouns
   - Adjectives

UNIT II **20 Hours**

1. Listening and Speaking
   a. Listening with a Purpose
   b. Effective Listening
   c. Tonal Variation
   d. Listening for Information
   e. Asking for Information
   f. Giving Information
2. Reading and Writing
   a. Strategies of Reading:

      Skimming and scanning
   b. Types of Reading:

      Extensive and Intensive Reading
   c. Reading a Prose Passage
   d. Reading a Poem
   e. Reading a Short Story

2. Paragraphs: Structure and types
    a. What is a Paragraph?
    b. Paragraph Structure
    c. Topic Structure
    d. Unity
    e. Coherence
    f. Connections between Ideas: Using Transitional words and expressions
    g. Types of Paragraphs
3. Study skills - II

    Using the internet as a resource
    a. Online search
    b. Know the keyword
    c. Refine your search
    d. Guidelines for using the Resources
    e. E- Learning resources of Government of India
    f. Terms to know
4. Grammar in Context

    Involving Action- I
    a. Verbs
    b. Concord

UNIT III **16 Hours**

1. Listening and Speaking
    a. Giving and following instructions
    b. Asking for and giving directions
    c. Continuing discussions with connecting ideas

    Reading and writing
    a. Reading feature articles (from newspapers and magazines)
    b. Reading to identify point of view and perspective (opinion pieces, editorials etc.)
    c. Descriptive writing - writing a short descriptive essay of two to three paragraphs

    Grammar in Context

    Involving Action- II
    - Verbal- Gerund, Participle, Infinitive
    - Modals

UNIT IV **16 Hours**

1. Listening and Speaking

   a. Giving and responding to opinions

2. Reading and writing

   a. Note taking

   b. Narrative writing - writing narrative essays of two to three paragraphs

   Grammar in Context

   Tense

   - Present
   - Past
   - Future

UNIT V **18 Hours**

1. Listening and Speaking

   a. Participating in a Group discussion

2. Reading and writing

   a. Reading diagrammatic information - interpretations, maps, graphs and pie charts

   b. Writing short essays using the language of comparison and contrast

3. Grammar in Context: Voice (Show the relationship between Tense and Voice)

COURSE BOOK

- Communicative English (For Students of Arts and Science Colleges) Tamilnadu State Council for Higher Education (TANSCHE)

ENGLISH FOR COMMUNICATION I - 20GE1GS01

QUESTION PATTERN

Time: 3 Hours **Marks: 75**

PART - A

1. Match the expressions (Introduce self/ others) (Unit I) 5 x 1 = 5
2. Interpret the given Diagrammatic chart 1 x 5 = 5
3. Write a day's happenings as journal entry 1 x 5 = 5
4. Write a narrative essay of two to three paragraphs 1 x 5 = 5

   (From Unit III)

PART - B

Answer the following **5 x 5 = 25**

5. Attempt a group discussion on the given topic

   (From Unit - V)

6. Write a conversation by giving opinions on the given topic

   (From Unit -IV)

7. Read the following passage and identify the point of view and perspective of the writer.

   (From Unit -III)

8. Take Notes for the given passage.

   (From Unit - IV)

9. Write any ONE paragraph on the following topics

   (From Unit - II)

PART - C

10. Identify the verbs in proverbs and terms in new media. 10x1=10

    (From Unit- II)

11. Fill up the blanks by using appropriate Noun & Pronoun/Adjective/ Verbs/ Concord/Gerund/ Participle/ Infinitive/ Modals/ Voice/ Tenses (all Units)

    20x1=20

GENERAL CONCEPTS IN CHEMISTRY - I

Semester: I **Hours: 6**

Code : 20CH1MC01 **Credits: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Describe the structure of atom and shape of the orbital	PSO-1	K, C
CO - 2	Predict the hybridization and the types of bonding	PSO-1	Ap
CO - 3	Acquire the knowledge on preparation and properties of alkanes, alkenes and alkynes	PSO-4	K, An
CO - 4	Explain the general characteristics of ideal and real Gases	PSO1,PSO-4	C
CO - 5	Summarize the various aspects of colloidal state	PSO-3	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**GENERAL CONCEPTS IN CHEMISTRY - I**							**Hours: 6**
Code : 20CH1MC01											**Credits: 6**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO1	**1**	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	3.18
CO2	4	4	4	4	3	2	2	4	2	3	3	3.45
CO3	4	4	4	4	2	2	4	4	3	3	4	3.36
CO4	4	4	4	4	2	2	3	4	2	4	4	3.45
CO5	4	4	4	4	3	2	3	4	4	3	3	3.81
Overall Mean Score												**3.45**

Result: The score for this course is **3.45** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

UNIT I

STRUCTURE OF ATOM:

Introduction - Bohr's postulates - Hydrogen spectrum - de Broglie concept of particle and wave character (dual character of electron)- derivation of de Broglie equation and Bohr angular momentum- experimental verification of de Broglie's relation - related simple problems - Heisenberg's uncertainty principle - Schrodinger Wave equation (equation only)- s, p, d, f orbitals and their shapes - Probability distribution of electrons around the nucleus - concept of atomic orbitals - differences between orbit and orbital - quantum numbers - Pauli's exclusion principle - Slator's rule: The concept of effective nuclear charge - simple calculations - applications - Hund's rule of maximum multiplicity - the Aufbau principle - electronic configuration of the elements - extra stability of half filled and completely filled orbitals **(18 Hours)**

UNIT II

STRUCTURE AND BONDING:

Introduction - hybridization - types of hybridization (sp^3, sp^2, sp) - types of covalent bonds - sigma bond - pi bond - bond length and factors affecting bong length: hybridization - electronegativity - delocalization - bond angles and factors affecting bond angles: hybridization - lone pair repulsion - electronegativity of central atom - bond energies - localized and delocalized chemical bonds - 1,3-butadiene and benzene - Van der Waals interactions or London Forces - inclusion compounds - charge- transfer complexes - inductive effect - application of inductive effect - field effect - electomeric effect - resonance - resonance energy - mesomeric effect- hyperconjugation - aromaticity (Huckel's Rule only) - hydrogen bonding - types of hydrogen bonding

ORGANIC REACTIONS AND INTERMEDIATES:

Introduction - notation used in organic chemistry: curved arrow notation, half headed arrow - homolytic and heterolytic bond breaking - types of reagents - electrophilic and nucleophilic reagents - types of organic reactions - substitution - addition - rearrangement - elimination reactions - $E_1$and E_2 mechanism - reactivity rates of reaction and energy profile - collision theory. Reactive intermediates - structure, formation and stability of carbocations, carbanions and carbon free radicals **(18 hours)**

UNIT III

a) ALKANES:

Introduction - IUPAC Nomenclature of branched and unbranched alkanes - the alkyl groups - classification of carbon atoms in alkanes - isomerism in alkanes - general methods of preparation : from decarboxylation of aliphatic monocarboxylic acids - Kolbe's electrolytic method - from alkyl halide - hydrogenation of alkenes and Corey -House synthesis - physical properties - chemical properties : oxidation - pyrolysis - isomerism - substitution reaction - aromatization

b) ALKENES:

Nomenclature - general methods of preparation : dehydration of alcohols and dehydrohalogenation of alkyl halide - dehalogenation of vicinal dihalides with zinc or iodide ion - electrolysis of salt of dicarboxylic acid - orientation in elimination reaction - Saytzeff and Hofmann rules - properties of alkenes: addition of halogen acids - Markownikoff's rule - alkadienes- nomenclature - classification -properties: 1,2 and 1,4 addition of halogens - Diels Alder reaction

c) ALKYNES:

Nomenclature - structure and bonding in alkynes - general methods of preparation- acidityofalkynes **(18 Hours)**

UNIT IV

GASEOUS STATE:

Kinetic molecular theory of gases- postulates of molecular theory of gases- kinetic energy and temperature- derivation of gas laws: Boyle's law, Charle's law, Avagadro's law, ideal gas equation, Graham's law of diffusion, Dalton's law of partial pressures - thermal motion of the molecules - Real gases - deviation of real gases from ideal behavior and compressibility factor - effect of temperature on deviations from ideal behavior- explanation for the deviations -van der Waals equation of state - derivation of the van der Waals equation- critical constants of a gas - P-V isotherms of carbon dioxide - molecular velocities: Maxwell's law of distribution of molecular velocities - types of molecular velocities - collision diameter- collision number - collision frequency- mean free path - liquefaction of gases: Joule- Thomson effect - Linde's apparatus- applications of liquefied gases

(18 Hours)

UNIT V

COLLOIDAL STATE:

Introduction - colloidal systems - classification of colloids: classification based on nature of interaction and manner of aggregation of colloidal systems - preparation of colloidal solutions: colloid mill, electrical dispersion and condensation methods - purification of colloidal solutions: dialysis - ultra filtration general properties of colloidal systems - properties of hydrophobic colloidal systems: electrical properties - origin of charge on colloidal particles - electrical double layer - protective colloids - Gold number - electrokinetic properties: electro osmosis - emulsions - classification - identification of the types of an emulsion - emulsifiers - applications of emulsions - colloidal electrolytes - importance and applications of colloids

(18 Hours)

COURSE BOOKS:

1. B. R. Puri, L. R. Sharma and K. C. Kalia, Graduate Inorganic Chemistry, Vishal Publishing Co., Volume - I, 2017 - 18 **Unit I**
2. M.K. Jain and S.C. Sharma and Fateh Bahadur, Graduate Organic Chemistry, Vishal Publishing Co., Volume - I, 2018-19 **Unit II and III**
3. Puri, Sharma, Pathania and Lark, Graduate Physical Chemistry, Vishal Publishing Co., Volume - I, 2018-19 **Unit IV and V**

BOOKS FOR REFERENCE:

1. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2007
2. K.S.Tewari, N.K. Vishnoi, A COURSE BOOKS of Organic Chemistry, Vikas Publishing House Pvt. Ltd., 3rd edition, 2006
3. Arun Bahl, B.S.Bahl, Advanced Organic Chemistry, S.Chand and company Ltd. 1st edition,2006
4. B.R. Puri, L.R. Sharma and S.Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 46th edition,2012
5. P.L. Soni, M. Katyal, Test book of Inorganic chemistry, Sultan Chand and Sons, 20th edition, 2006

PRACTICAL: SEMI-MICRO INORGANIC QUALITATIVEANALYSIS

(Examination at the end of II Semester)

Semester: I & II **Hours: 3+3**

Code : 20CH1CP01 & 20CH2CP01 **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Analyse cations and anions present in a given inorganic sample adopting systematic procedure	PSO-1	K, An
CO - 2	Acquire skills to perform precipitation and Centrifugation methods	PSO-2	K, An
CO - 3	Identify and eliminate interfering anions in a given sample	PSO2,PSO3	E
CO - 4	Appreciate the characteristic quality of a inorganic substance	PSO-3	An
CO - 5	Adopt safety measures in handling chemicals	PSO-3	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I & II												**Hours: 3+3**
Code : 20CH1CP01& 20CH2CP01							**PRACTICAL: SEMI-MICRO INORGANIC QUALITATIVEANALYSIS**					**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO1	3	3	5	3	3	3	4	4	4	4	4	3.63
CO2	4	3	4	3	3	3	4	4	4	3	4	3.54
CO3	5	3	4	3	3	3	4	4	4	3	4	3.63
CO4	5	3	4	3	3	3	4	4	5	4	4	3.81
CO5	4	3	4	3	4	4	4	4	4	3	4	3.72
Overall Mean Score												**3.66**

Result: The score for this course is **3.66** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

Analysis of a mixture containing two cations and two anions of which, one is interfering anion following semi-micro method.

ANIONS:

Carbonate, sulphate, nitrate, chloride, bromide, oxalate, borate, phosphate, chromate and fluoride

CATIONS:

Lead, copper, cadmium, bismuth, antimony, iron, aluminium, zinc, manganese, cobalt, nickel, barium, strontium, calcium, magnesium and ammonium

COURSE BOOK:

1. V. Venkateswaran, R. Veerasamy and A. R. Kulandaivelu , Basic principles of Practical chemistry , Sultan Chand and sons, 2nd edition, 2012

ALLIED MATHEMATICS - I

Semester: I **Hours: 5**

Code : 20MA1AC01 **Credits: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Solve the problems in differentiation.	PSO - 2	C
CO - 2	Evaluate the double integrals by changing the order of integration.	PSO - 4	E
CO - 3	Acquire the knowledge about fourier series.	PSO - 2	S
CO - 4	Identify the relation between roots and coefficients of equations.	PSO - 3	Ap
CO - 5	Analyze the concepts of transformation of equations.	PSO - 2 , PSO - 4	An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester : I												**Hours: 5**
Code : 20MA1AC01						**ALLIED MATHEMATICS - I**						**Credits: 4**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO1	3	3	4	3	3	3	3	4	3	3	3	3.18
CO2	4	3	3	3	3	3	3	3	3	4	3	3.18
CO3	4	3	3	3	3	3	3	4	3	3	3	3.18
CO4	4	3	3	4	3	3	3	3	4	3	3	3.27
CO5	3	4	3	3	3	3	3	4	3	4	3	3.27
Overall Mean Score												**3.21**

Result: The Score for this Course is 3.21 (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

UNIT I

Successive differentiation - n^{th} derivative - standard results - Leibnitz formula for n^{th} derivative – Jacobians. **(15 Hours)**

UNIT II

Multiple integrals - double integrals - changing the order of integration in double integrals - double integral in polar coordinates. **(15 Hours)**

UNIT III

Fourier series - Fourier coefficients - the cosine and sine series. **(15 Hours)**

UNIT IV

Theory of equations: Relation between roots and coefficients - Reciprocal equations. **(15 Hours)**

UNIT V

Transformation of equations -approximate solutions of numerical equations: Newton's method - Horner's method. **(15 Hours)**

COURSE BOOK:

Course material compiled by the Department.

BOOKS FOR REFERENCE :

1. S. Arumugam and A. Thangapandi Isaac, Ancillary Mathematics Paper I, New Gamma Publishing House, 1996.
2. S. Arumugam and A.Thangapandi Isaac, Ancillary Mathematics Paper III, New Gamma Publishing House, 2002.

ALLIED ZOOLOGY - I

Semester: I **Hours: 3**

Code : 20ZO1AC01 **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Equip them for self employment.	PSO - 2, PSO - 5	K, Ap, An
CO - 2	Gain knowledge on bee keeping and the importance of honey and its medicinal value.	PSO - 3, PSO - 4, PSO - 5	K, Ap
CO - 3	Estimate the economic importance of silk worm.	PSO - 1, PSO - 4	K, Ap
CO - 4	Design their career in aquaculture.	PSO - 4, PSO - 5	Ap, E
CO - 5	Attain knowledge on Dairy farming.	PSO - 5	K, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**ALLIED ZOOLOGY - I**							**Hours: 3**
Code : 20ZO1AC01											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	2	2	2	4	5	5	3	2	5	5	3.55
CO - 2	4	2	2	2	2	5	5	3	2	5	5	3.36
CO - 3	4	2	2	2	3	4	5	4	2	5	5	3.45
CO - 4	4	2	2	2	2	5	5	5	2	5	5	3.55
CO - 5	4	3	2	2	2	5	5	5	2	5	5	3.64
Overall Mean Score												**3.51**

Result: The Score for this Course is **3.51** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

UNIT I

Vermitechnology: Scope of Vermitechnology, Importance of Vermitechnology, Collection, Methods of Collection of Earthworm. Vermiculture techniques, Methods of vermicomposting, worm cast, worm wash. Species of earth worm: - *Perionyx excavates*, *Lumbricus rubellus*. Diseases of earth worm -Blister disease, *Rhizoctonia solani.* **(9 Hours)**

UNIT II

Bee Keeping: Scope of bee keeping, Identification of Honey Bees, Choice of Bee in Apiculture, Principles of Beekeeping, Hives, Appliances of Apiaries, Honey Extraction, Honey, Bees - Wax, Bee Venom, Swarming, Queen Rearing. Diseases of honey bee - Acariasis, Varroatosis. **(9 Hours)**

UNIT III

Sericulture: Scope of Sericulture, Sericulture in India, Sericulture as a cottage Industry, Moriculture, biology Silk worms, Typesof silk worm - Eri, Muga, Tasar. Rearing of Silk worms, Silk Reeling. Disease of silk worm - Grasserie, flacherie.

(9 Hours)

UNIT IV

Aquaculture: Scope of Aquaculture, Culture of Indian Major Carps - Catla, Tilapia Culture, Culture of Freshwater Prawns, Integrated Fish Farming, Live Feed Culture - Artemia culture, Oyster Culture. Diseases of fishes - Swim bladder disease, Fin rot disease. **(9 Hours)**

UNIT V

Dairy Farming: Scope of Dairy Farming, Dairy Animals - Red sindhi cattle, Ongoli cattle, Khillari cattle, Bargur cattle. Management of a model dairy farm, Formulation of standards for pasteurization, Artificial insemination in cattle. Diseases of cattle - Blackleg and Bovine Viral Diarrhea. **(9 Hours)**

BOOKS FOR REFERENCE:

1. Arumugam N., Murugan S., Johnson Rajeshwar and Ram Prabhu R., (2005). Applied zoology. Saras Publications, Kanyakumari.
2. Harbans Singh Earl N. Moore., (1982). Live stock and poultry production and prentice. Hall of India Pvt. Ltd, New Delhi.
3. Jameson J.D and Santhanam R., (1996). Manual of Ornamental Fishes and Farming Technologies. Fisheries College and Research Institute, Tuticorin.
4. Ganga G., and Sulochana Chetty (1991). An introduction to sericulture. Oxford & IBH Publishing Company.
5. Kichisaburo M. (1997). Moriculture - Science of mulberry cultivation. Oxford & IBH.

ALLIED ZOOLOGY - I - LAB

Semester: I **Hours: 2**

Code : 20ZO1AP01 **Credits: 1**

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Mount the body setae of earthworm.	PSO - 2, PSO - 4	An, E
CO - 2	Gain knowledge on bee keeping and the importance of honey and its medicinal value.	PSO - 1, PSO – 4, PSO - 5	K, An, Ap
CO - 3	Estimate the economic importance of silk worm.	PSO - 3, PSO - 4, PSO - 5	Ap, An
CO - 4	Design their career in aquaculture.	PSO - 4, PSO - 5	K, Ap, E
CO - 5	Attain knowledge on Dairy farming.	PSO - 2, PSO - 5	Ap, E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				ALLIED ZOOLOGY - I - LAB							Hours: 2
Code : 20ZO1AP01											Credits: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	4	2	2	2	2	4	3	3	2	5	4	3.00
CO - 2	5	2	2	2	2	4	3	4	2	5	5	3.27
CO - 3	5	2	2	2	2	4	4	3	2	5	5	3.27
CO - 4	5	3	2	2	2	5	4	4	2	5	5	3.55
CO - 5	5	3	3	2	2	5	4	4	2	5	5	3.64
Overall Mean Score												**3.35**

Result: The Score for this Course is 3.35 (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

1. MOUNTING:

    Body setae of earthworm

    Mouth parts of Honey bee

    Honey bee sting

    Appendages of prawn

2. Preparation of vermicompost.
3. Extraction of honey.
4. Study on selection of mulberry leaves to appropriate size according to different stage of growth of larva.
5. Life history of silk moth- Egg ,larva, pupa, adult. (Chart).
6. Visit to local dairy farm and report submission.
7. Field visit to sericulture farm and report submission.

SPOTTERS:

Perionyx excavates, *Rhizoctonia solani* , Worm wash, Worm cast, *Apis indica*, Bee wax, *Bombyx mori,* Chandrika, Rearing tray, Rearing stand, Hive, Honey extractor Smoker, Tilapia, Carp, Prawn, Oyster, Artemia.

PROFESSIONAL ENGLISH

Semester: I **Hours: 2**

Code : 20CH1AE01 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognise their own ability to improve their competence in using the language	PSO-1, PSO-4	C,AP, S
CO - 2	Use language for speaking with confidence in an intelligible and acceptable manner	PSO-1, PSO-4, PSO-3,PSO-5	C, AP, E
CO - 3	Read independently unfamiliar texts with comprehension	PSO-2, PSO-3, PSO-5	K,C, AP,E
CO - 4	Understand the importance of reading for life and writing in academic life.	PSO-1, PSO-3, PSO-4, PSO-5	C, AP, E
CO - 5	Write simple sentences without committing error of spelling or grammar	PSO-4	C,E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester : I				**PROFESSIONAL ENGLISH**							**Hours: 2**
Code : 20CH1AE01											**Credits: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO-1	4	4	4	4	4	4	4	3	4	4	4	3.90
CO-2	3	4	4	4	4	4	4	3	4	4	4	3.81
CO-3	4	3	3	3	4	4	4	4	3	3	4	3.63
CO-4	3	4	4	3	4	4	4	3	3	3	4	3.54
CO-5	3	4	3	3	3	3	3	4	4	4	4	3.45
Overall Mean Score												**3.68**

Result: The score for this course is 3.68 (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

NB: All four skills are taught based on texts/passages.

UNIT I: COMMUNICATION

Listening: Listening to audio text and answering questions - Listening to Instructions

Speaking: Pair work and small group work

Reading: Comprehension passages –Differentiate between facts and opinion

Writing: Developing a story with pictures

Vocabulary: Register specific - Incorporated into the LSRW tasks

UNIT II: DESCRIPTION

Listening: Listening to process description. - Drawing a flow chart.

Speaking: Role play (formal context)

Reading: Skimming/Scanning - Reading passages on products, equipment and gadgets

Writing: Process Description –Compare and Contrast - Paragraph- Sentence Definition and Extended definition-Free Writing

Vocabulary: Register specific -Incorporated into the LSRW tasks

UNIT III: NEGOTIATION STRATEGIES

Listening: Listening to interviews of specialists / Inventors in fields (Subject specific)

Speaking: Brainstorming (Mind mapping) - Small group discussions (Subject - Specific)

Reading: Longer Reading text

Writing: Essay Writing (250 words)

Vocabulary: Register specific - Incorporated into the LSRW tasks

UNIT IV: PRESENTATION SKILLS

Listening: Listening to lectures

Speaking: Short talks

Reading: Reading Comprehension passages

Writing: Writing Recommendations - Interpreting Visuals inputs

Vocabulary: Register specific -Incorporated into the LSRW tasks

UNIT V: CRITICAL THINKING SKILLS

Listening: Listening comprehension- Listening for information

Speaking: Making presentations (with PPT- practice)

Reading: Comprehension passages – Note making - Comprehension: Motivational article on Professional Competence, Professional Ethics and Life Skills)

Writing: Problem and Solution essay– Creative writing –Summary writing

Vocabulary: Register specific - Incorporated into the LSRW tasks

COURSE BOOK:

- *English for Physical Sciences* by Tamil Nadu State Council for Higher Education

INTERNAL ASSESSMENT	
COMPONENTS	**MARKS**
Test-I	30
Test-II	30
Listening Comprehension	10
Reading Comprehension	10
Language lab (Speaking skills)	10
Assignment	10
Total	**100**

PROFESSIONAL ENGLISH - 20CH1AE01

QUESTION PATTERN

Time: 1 Hour **Max. Marks: 30**

I. Match the following 10

or

True or False

II. Writing Definition 5

or

Transcript of a passage

III. Sketch mind maps for the following 10

or

Essay Writing

IV. Comprehension on short talks 5

or

Writing Recommendations

STREAM - B

COMPUTER EDUCATION

(for B.Sc.Mathematics, Physics and Chemistry programmes)

Semester: I **Hours: 2**

Code : 20SE1CE1B **Credits: 2**

COURSE OUTCOMES:

- Handle the tools of MS office
- Create animations, presentations and documents
- Prepare spreadsheets using MS Excel for various applications
- Develop computational skills and apply Google Apps for ICT learning
- Use DTP skills to become an Entrepreneur.

MICROSOFT OFFICE 2017

MS WORD: (Word processing software)

1. Formatting
2. Table Creation
3. Mail Merge
4. Preparation of advertisement using drawing tool

MS EXCEL: (Electronic spread sheets)

1. Excel Function (statistical)
2. Data filtering and sorting
3. Mark sheet, pay bill Preparation
4. Data analysis using chart

MS POWERPOINT:(Presentation)

1. Theme - based presentation with Animation Effects
2. PPT Record Narration

MOBILE APPLICATIONS I:

1. Gmail
2. Cloud based callendar, mail
3. Google docs
4. Google groups

MOBILE APPLICATIONS II:

1. E books
2. Video chat, online chat
3. Cloud storage
4. Form creation
5. Assistant

COURSE BOOK:

Study Material prepared by Mathematics, Physics and Chemistry.

BOOKS FOR REFERENCE:

1. D. P. Nagpal - Computer Fundamentals - S. Chand & Company Ltd, New Delhi - 1999.
2. V. Rajaraman - Fundamentals of Computers, 3rd edition - Prentice Hall of India Private Limited - 2001.
3. B. Ram - Computer Fundamentals, 3rd edition - New Age International Pvt. Ltd – 2010
4. Web resources

இடைக்கால இலக்கியமும் நாவலும்

பருவம்: இரண்டு **நேரம்: 6**

குறியீடு: 20GT2GS02 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	சைவ, வைணவ அடியார்களின் பக்தியைப் பற்றி அறிந்து கொள்வர்.	PSO - 4	புரிதல்
CO-2	அடியார்களின் வழி இறைவனின் அருள் தன்மையைப் புரிந்து கொள்வர்.	PSO - 4	அறிவு
CO-3	செய்யுள் எழுதும் முறையைக் கற்றுக் கொள்வர்.	PSO - 1	புரிதல்
CO-4	வெற்றிச் சிறப்பைப் போற்றும் முறையைத் தெரிந்து கொள்வர்.	PSO - 3	அறிவு
CO-5	செய்யுள் வழி உரைநடையையும், புதின மரபையும் கற்றுக் கொள்வர்.	PSO - 1	அறிவு, புரிதல்

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II			இடைக்கால இலக்கியமும் நாவலும்								**Hours: 6**
Code : 20GT2GS02											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO_S**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	2	4	5	3	4	5	5	4	3	4.25
CO - 2	4	4	5	4	3	5	5	3	2	5	3	4.19
CO - 3	4	5	4	2	5	3	4	5	5	2	3	3.83
CO - 4	5	3	5	2	4	5	3	2	4	5	4	3.83
CO - 5	5	5	4	5	4	3	2	4	5	3	2	3.83
Overall Means Score												**3.98**

Result: The Score of this Course is **3.98** (High Relationship)

Note:

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

அலகு1: சைவம்

1. திருஞானசம்பந்தர் - திரு ஆலவாய் - 2 பாடல்கள்
    1. மந்திரமாவது நீறு...
    2. வேத்திலுள்ளது நீறு ...
2. திருநாவுக்கரசர் - தேவாரம் - 2 பாடல்கள்
    1. நாமார்க்கும் குடியல்லோம்...
    2. பாலனாய்க் கழிந்த ...
3. சுந்தரர் - தேவாரம் - 2 பாடல்கள்
    1. ஊனாய் உயிர் ஆனாய் ...
    2. மழுவாள் வலன் ஏந்தி மன்ற ...
4. மாணிக்கவாசகர் - சிவபுராணம் 15 வரிகள்

    நமச்சியவாய வாழ்க முதல்... சீரார் பெருந்துறை நம்தேவன் அடி போற்றி வரை

அலகு2: வைணவம்:

1. பேயாழ்வார் - திருக்கண்டேன்...
2. பூதத்தாழ்வார் - அன்பே தகளியா...
3. பொய்கையாழ்வார் - வையம் தகளியா...
4. ஆண்டாள் - திருப்பாவை முதல் 10 பாடல்கள்

அலகு3: சிற்றிலக்கியங்கள்

1. கலிங்கத்துப்பரணி - இந்திர சாலம்
2. நந்திக் கலம்பகம்
    1. மயில் கண்டால் மயிலுக்கே வருந்தியாங்கே - 25வது பாடல்
    2. ஓடரிக்கண் மடநல்லீர் ஆடாமோ ஊசல் - 29வது பாடல்
    3. அறம்பெருகும் தனிச்செங்கோன் மாயன் தொண்டை – 60வது பாடல்

அலகு4: குறுநாவல்

ரட்டை வால் குருவி – யாழ் எஸ். ராகவன்

அலகு5:

இலக்கணம்: யாப்பின் உறுப்புக்கள்

இலக்கிய வரலாறு - பக்தி இலக்கியம், சிற்றிலக்கியம் தொடர்பான பகுதிகள்
நாவலின் தோற்றமும் வளர்ச்சியும்.

பாடநூல்கள்:

1. தமிழ்த்துறை வெளியீடு - இடைக்கால இலக்கியம்,
   ஜெயராஜ் அன்னபாக்கியம் மகளிர் கல்லூரி,
   பெரியகுளம்
2. எம்.ஆர்.அடைக்கலசாமி - தமிழ் இலக்கிய வரலாறு, ராசி பதிப்பகம்,
   சென்னை - 73, 41ஆம் பதிப்பு.
3. யாழ் எஸ். ராகவன் - ரட்டை வால் குருவி,
   நியூசெஞ்சுரி புக் ஹவுஸ் (பி) லிமிடெட், சென்னை.
   மு.ப. 2020

ENGLISH FOR COMMUNICATION - II

Semester: II **Hours: 6**

Code : 20GE2GS02 **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO -1	Develop a fair degree of competence in self-expression in both writing and speaking.	PSO-1, PSO-3, PSO-4	C, S
CO -2	Read and comprehend texts.	PSO-2, PSO-4, PSO-5	K, AP
CO -3	Use academic resources.	PSO-1, PSO-2, PSO-5	AP, A
CO-4	Engage in independent learning.	PSO-1, PSO-4, PSO-5	C
CO -5	Obtain critical and analytical thinking.	PSO-1, PSO-5	C, AP, A

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester : II				**ENGLISH FOR COMMUNICATION - II**							**Hours: 6**
Code : 20GE2GS02											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of COs**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO-1	3	5	3	3	3	3	3	4	5	3	4	3.54
CO-2	4	5	4	3	3	4	3	4	4	3	5	3.81
CO-3	4	4	3	3	5	4	3	4	3	3	5	3.72
CO-4	3	4	3	4	3	4	3	3	5	3	5	3.63
CO-5	4	4	3	3	4	4	3	4	5	4	5	3.90
Overall Mean Score												**3.72**

Result: The score for this course is 3.72 (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I **18 Hours**

1. Speaking and listening

a. Participating in group discussions

Reading and writing

a. Reading short fictional pieces

i. Reading aloud
ii. Identifying mood, tone, point of view
iii. Working with diction

b. Writing short argumentative essays of two to three paragraphs

c. Writing a resume

Grammar in Context

a. Subject Verb Agreement

b. Active and passive voice

UNIT II **18 Hours**

1. Speaking and Listening

a. Making short presentations

b. Interactions during and after the presentations

Reading and Writing

a. Writing opinion pieces (could be on travel, food, film / book reviews or on any contemporary topic)
b. Writing a cover letter
c. Reading poetry

i. Reading aloud: (Intonation and Voice Modulation)
ii. Identifying and using simile, metaphor, personification etc.

Grammar in Context

a. Idioms and phrasal verbs

b. Second and third conditional

UNIT III **18 Hours**

1. Speaking and Listening

a. Note making

Reading and writing

a. Writing emails of complaint
b. Reading longer fictional / non-fictional pieces in which all the reading skills can be brought into play
c. Preparing outlines for short assignments

3. Grammar in Context

a. Working with clauses

b. Direct and indirect speech

UNIT IV **18 Hours**

1. Speaking and Listening
   a. Listening to understand different accents

   Reading and Writing
   a. Reading visual texts - advertisements
   b. Preparing first drafts of short assignments
   c. Writing cover letter

UNIT V **18 Hours**

1. Speaking and listening
   a. Taking leave

   Reading and Writing
   a. Peer-reviewing
   b. Preparing final draft using peer review comments
   c. Writing letters of application
   d. Readers' Theatre: (Reading aloud a given script - Scripts by Aaron Shepherd available on the internet)
   e. Dramatizing everyday situations/social issues through skits. (writing scripts and performing)

COURSE BOOK:

- Communicative English (For Students of Arts and Science Colleges) Tamilnadu State Council for Higher Education (TANSCHE)

ENGLISH FOR COMMUNICATION – II 20GE2GS02

Question Pattern

Time: 3 Hours **Marks: 75**

1.	Fill in the blanks with suitable answers	20 × 1 = 20
2.	Write a resume for job application (unit- I)	1 × 5 = 5
3.	Writing on contemporary topics (unit-II)	1 × 5 = 5
4.	Letter Writing (unit - II, V)	1 × 10 = 10
5.	Business Letter/ email Writing (unit-III)	1 × 10 = 10
6.	Note Making (unit- III)	1 × 10 = 10
7.	Writing short essays (unit- I)	1 × 10 = 10
8.	Writing Advertisement (unit-IV)	1 × 5 = 5

GENERAL CONCEPTS IN CHEMISTRY - II

Semester: II **Hours: 6**

Code : 20CH2MC02 **Credits: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Explain the periodicity variation and properties of block elements	PSO-1	K, C
CO - 2	Acquire knowledge about oxidation and reactions and the concepts of nuclear chemistry and radioactivity	PSO-1	K, Ap
CO - 3	Appreciate the reactions of alkyl halides and cyclo alkanes	PSO-1, PSO-2	K, An
CO - 4	Recall the characteristics of the phenomena such as catalysis and adsorption	PSO-1, PSO-4	C, Ap
CO - 5	Outline the fundamentals of photochemistry	PSO-3, PSO-4	K, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**GENERAL CONCEPTS IN CHEMISTRY - II**							**Hours: 6**
Code : 20CH2MC02											**Credits: 6**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO1	4	3	3	3	4	3	4	4	5	3	4	3.63
CO2	4	3	3	3	4	3	4	4	5	3	4	3.63
CO3	3	4	4	3	4	3	3	4	4	3	4	3.54
CO4	3	3	4	3	3	3	4	4	3	3	4	3.36
CO5	4	3	5	3	3	3	4	4	3	3	4	3.54
Overall Mean Score												**3.54**

Result: The score for this course is **3.54** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I

a) PERIODIC PROPERTIES:

Long form of periodic table - position of elements in the periodic table-periods, groups - cause of periodicity - division of elements into s, p, d, and f blocks - periodic properties - sizes of atoms and ions - covalent radius - van der Waals radius - ionic radius- ionization energy- factors determining ionization energy, electron affinity and electronegativity

b) s-BLOCK ELEMENTS:

General characteristics of alkali metals and alkaline earth metals-physical properties-chemical properties-diagonal relationship - function of s- block elements **(18 Hours)**

UNIT II

a) OXIDATION AND REDUCTION:

Definition of oxidation and reduction- oxidising agent - reducing agent-oxidation number calculations - redox reactions- galvanic cells-oxidation and reduction potentials

b) NUCLEAR CHEMISTRY AND RADIOACTIVITY:

Nuclear chemistry, nuclear particles, packing fraction, mass defect - binding energy of the nucleus - related problems - binding energy and stability - nuclear fission : atom bomb - nuclear fusion: hydrogen bomb, energy of the sun - radio activity - rate of radioactivity disintegration - units of radioactivity - half life period - nature of radiations from radioactive elements -group displacements law -Geiger Muller counter - carbon dating **(18 Hours)**

UNIT III

a) ALKYL HALIDES:

Introduction - classification of monohaloalkanes - nomenclature - methods of preparation - physical and chemical properties - nucleophilic substitution reactions: S_N1 and S_N2 - Difference between S_N2 and S_N1 reactions - other reactions - polyhalogen compounds: Preparation and uses of tetrafluoroethylene, freons, chloroform, westron and difluoromethane

b) CYCLO ALKANES (Alicyclic Compounds):

Introduction -nomenclature-occurrence-general methods of preparation - physical and chemical properties - stability of cycloalkanes - Baeyer's Strain theory - Sachse-Mohr theory of Stainless rings - molecular orbital theory of angle strain - cyclopropane (banana bond)-difference between configuration and conformation - conformational isomers- conformations of cyclohexanes - mono-substituted and di-substituted cyclohexane **(18 Hours)**

UNIT IV

a) CATALYSIS:

Catalysis - auto catalysis - promoters - negative catalysis - general characteristics of catalytic reactions - types of catalysis - Homogenous catalysis: acid base catalysis, enzyme catalysis (No mechanism) - heterogeneous catalysis : examples for catalysis involving solid, liquid and gaseous reactants -usage of Lindlar catalyst, Adam's catalyst and Ziegler-Natta catalyst- industrial applications of catalysts

b) ADSORPTION:

Definition - difference between adsorption and absorption - physical and chemical adsorption - factors influencing adsorption - Freundlich adsorption isotherm - Langmuir adsorption isotherm - applications **(18 Hours)**

UNIT V

PHOTOCHEMIRY:

Introduction - photophysical and photochemical processes - importance of photochemistry - difference between thermochemical and photochemical reactions - light absorption by solutions :Beer- Lambert law - laws of photochemistry: Grotthus - Draper law - Stark- Einstein law - quantum efficiency - photochemical reactions: decomposition of HI - luminescence : chemiluminesence - fluorescence - phosphorescence - Jablonski diagram - energy transfer in photochemical reactions: photosensitization - photosynthesis in plants - Lasers: Definition and applications in chemistry **(18 Hours)**

COURSE BOOKS:

1. B.R. Puri, L.R. Sharma and K.C. Kalia, Graduate Inorganic Chemistry, Vishal Publishing Co., Volume - I, 2017-18 **Unit I and II**
2. M.K. Jain and S.C. Sharma and Fateh Bahadur, Graduate Organic Chemistry, Vishal Publishing Co., Volume - I, 2018-19 **III**
3. Puri, Sharma, Pathaniya and Lark, Graduate of Physical Chemistry, Vishal Publishing Co., Volume - I & III, 2018-19 **Unit IV and V**

BOOKS FOR REFERENCE:

1. P.L. Soniand H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2007.
2. K.S.Tewari, N.K. Vishnoi, A COURSE BOOKS of Organic Chemistry, Vikas Publishing House Pvt. Ltd., 3rd edition, 2006
3. ArunBahl, B.S.Bahl, Advanced Organic Chemistry, S..Chand and company Ltd. 1st edition,2006
4. B.R. Puri, L.R. Sharma and S.Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 46th edition,2012
5. P.L. Soni, M. Katyal, Test book of Inorganic chemistry, Sultan Chand and Sons, 20th edition, 2006.
6. R.D. Madan Modern Inorganic Chemistry, S.Chand and company Ltd., 3rd edition, 2012.

ALLIED MATHEMATICS - II

Semester: II **Hours: 5**

Code : 20MA2AC02 **Credits: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify the methods of solving linear differential equations with variable coefficients.	PSO - 1, PSO - 5	K
CO - 2	Solve ordinary differential equations using Laplace and inverse Laplace transform.	PSO - 2	E
CO - 3	Formulate and solve partial differential equations using some standard forms.	PSO - 2 , PSO - 3	S
CO - 4	Compute vector integration and vector differentiation.	PSO - 4	Ap
CO - 5	Apply the concept of line and surface integrals in solving double and triple integrals.	PSO - 2	Ap, S

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester : II				**ALLIED MATHEMATICS - II**							**Hours: 5**
Code : 20MA2AC02											**Credits: 4**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO1	4	3	3	3	3	3	4	3	3	3	4	3.27
CO2	4	3	4	3	3	3	3	4	3	3	3	3.27
CO3	3	4	3	3	3	3	3	4	4	3	3	3.27
CO4	4	3	3	4	3	3	3	3	3	4	3	3.27
CO5	3	3	3	4	3	3	3	4	3	3	3	3.18
Overall Mean Score												**3.25**

Result: The Score for this Course is 3.25 (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

Homogeneous linear equations of second order - linear equations with variable coefficients - variation of parameters. **(15 Hours)**

UNIT II

Laplace transform - Definitions - Theorems on Laplace transforms - Evaluation certain integrals using Laplace Transform - inverse Laplace transform. Solving ordinary differential equations using Laplace transform. **(15 Hours)**

UNIT III

Partial differential equations - formation of PDE - methods of solving first order PDE - some standard forms. **(15 Hours)**

UNIT IV

Vector differentiation - Vector differential operator - gradient - Directional derivative - divergence and curl - Solenoidal and irrotational vectors. **(15 Hours)**

UNIT V

Vector integration - line integrals - surface integrals - theorems of Green, Gauss and Stokes (problems only). **(15 Hours)**

COURSE BOOK:

Course material compiled by the Department

BOOKS FOR REFERENCE :

1. S. Arumugam and A. Thangapandi Issac, Ancillary Mathematics Paper II, New Gamma Publishing House, 1996.
2. S. Arumugam and A. Thangapandi Issac, Ancillary Mathematics Paper III, New Gamma Publishing House, 1997.

ALLIED ZOOLOGY - II

Semester: II **Hours: 3**

Code : 20ZO2AC02 **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Equip them for self employment by poultry farming.	PSO - 2, PSO - 5	K, Ap
CO - 2	Apply knowledge on mushroom culture.	PSO - 3, PSO - 4	S, K, Ap
CO - 3	Elucidate the food preservation methods.	PSO - 1, PSO - 3	C, Ap
CO - 4	Enlist the industrially important microorganisms.	PSO – 4, PSO - 5	K, An, Ap
CO - 5	Attain knowledge on Industrial microbiology.	PSO - 4, PSO - 5	S, K, An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**ALLIED ZOOLOGY - II**							**Hours: 3**
Code : 20ZO2AC02											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	5	4	2	2	5	4	5	2	5	5	4.00
CO - 2	5	5	4	2	3	5	3	5	2	5	5	4.00
CO - 3	5	5	4	2	2	5	3	5	3	4	5	3.91
CO - 4	5	4	3	2	3	5	3	5	4	4	5	3.91
CO - 5	5	5	2	2	2	5	3	5	4	4	5	3.82
Overall Mean Score												**3.93**

Result: The Score for this Course is 3.93 (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

Poultry Farming: Scope of poultry farming, nutritive value of egg and meat, common breeds of fowl - Vanaraja, Kadaknath, Poultry housing and equipment, incubation, collection and storage of eggs. Fumigation, hatchery sanitation, sexing, de - beaking and de - worming. Rearing and management of broiler and layer. Poultry diseases - Ranikhet disease and Fowl pox. **(9 Hours)**

UNIT II

Mushroom Culture: Scope of mushroom culture, nutritive value, spawn production, preparation of culture, mother spawn production for oyster mushroom, multiplication of spawn, cultivation techniques, harvesting, packing and storage, problems in cultivation. Identification of edible (*Agaricus bisporus, Pleurotus ostreatus*) and poisonus type (*Conocybe filaris, Amanita phalloides.*) Processing and preservation of mushrooms **(9 Hours)**

UNIT III

Food Microbiology: Fermented food products - Yoghurt (milk), sauerkraut (vegetables), leavening of bread. Microbial spoilage of meat, milk, fruits, vegetables and canned food in brief. Food infection (Salmonellosis) and food poisoning (Botulism).Food preservation methods **(9 Hours)**

UNIT IV

Industrial Microbiology: Role of microbes in industrial process- production, assisting and waste disposal microbes. Types of fementers - batch and continuous fermentation. Methods of fermentation- solid substrate and submerged fermentation. **(9 Hours)**

UNIT V

Industrial Microbiology: Production of organic acid (Ethanol), amino acid (glutamic acid), large scale production of antibiotics - Penicillin, enzyme - amalyse, hormone - Insulin and vaccine - BCG and fermented food products - wine. Single cell protein culture. **(9 Hours)**

BOOKS FOR REFERENCE:

1. Arumugam N., Murugan S., Johnson Rajeshwar and Ram Prabhu R., (2005). Applied zoology. Saras Publications, Kanyakumari.
2. Harbans Singh Earl N. Moore., (1982). Live stock and poultry production and prentice. Hall of India Pvt. Ltd, New Delhi.
3. John William, S. (2003). Poultry for Sustainable Food Production and Livelihood. Loyola Publication, Chennai.
4. Banerjee, G. C., (1992). Poultry, Oxford and IBH, New Delhi.
5. Gupta P.K., (2003). Elements of Biotechnology, Rastogi publications.
6. Pelcezar M.J., (1993) Microbiology and Reid. RcGraw Hill Book Company, New York.
7. Nita Bhal. (2002). Handbook on Mushrooms (4^{th} ed.). Vijay Primlani for Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
8. Tripathi, D.P. (2005) Mushroom Cultivation, Oxford & IBH Publishing Co. PVT. LTD, New Delhi.

ALLIED ZOOLOGY - II - LAB

Semester: II **Hours: 2**

Code : 20ZO2AP02 **Credits: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Equip them for self employment by poultry farming.	PSO - 3, PSO - 5	K, Ap, E
CO - 2	Apply knowledge on mushroom culture.	PSO - 1, PSO - 4	C, Ap, E
CO - 3	Demonstrate the food preservation methods.	PSO - 2, PSO - 4	An, S
CO - 4	Elucidate on sterilization techniques.	PSO - 3	K, Ap
CO - 5	Apply the knowledge on Industrial biotechnology.	PSO - 4, PSO - 5	K, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**ALLIED ZOOLOGY - II - LAB**							**Hours: 2**
Code : 20ZO2AP02											**Credits: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	5	4	2	2	5	2	5	2	5	5	3.82
CO - 2	5	5	4	2	2	5	2	5	2	5	5	3.82
CO - 3	5	4	3	2	2	5	2	5	2	5	5	3.64
CO - 4	5	5	4	2	2	5	2	5	2	5	4	3.73
CO - 5	5	5	3	2	2	5	2	5	2	5	4	3.64
Overall Mean Score												**3.73**

Result: The Score for this Course is 3.73 (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

1. Spawn production of mushroom.
2. Visit to poultry farm.
3. Collection of eggs.
4. Assessment of air pollution.
5. Cleaning and sterilization of glasswares.
6. Preparation of culture media for microbes.
7. Study of microbial population in raw milk and soil.

SPOTTERS:

Breeds of fowl - Gramapriya, Vanaraja, Kadaknath. Model poultry house, Dropping pit, Water basin, Nipple drinker, Sauerkraut, Edible mushroom - Button (white) mushroom, Chanterelle (Girolle), Oyster Mushroom, Enoki (snow puff), Non - Edible mushroom - Death cap - *Amanita phalloides, Conocybe filaris,* Webcaps cortinarius species, Fermentor, Biosensor, Yoghurt, *Rodolia cardinalis*.

ENVIRONMENTAL STUDIES

PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Endow with in-depth knowledge, analyze and apply the understanding of their discipline for the betterment of self and society.
2.	Synthesize ideas from various disciplines, enhance the interdisciplinary knowledge and extend it for research.
3.	Gain confidence and skills to communicate orally/ verbally in research platforms and state a clear research finding.
4.	Develop problem solving and computational skills and gain confidence to appear for the competitive examinations.
5.	Enhance knowledge regarding research by accumulating practical knowledge in specific areas of research.
6.	Achieve idealistic goals and enrich the values to tackle the societal challenges.

PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Assess the scope and importance of environmental studies and need for public awareness	PO1,2,3
2.	Develop deeper understanding in classification of resources	PO 1,2,5
3.	Analyse the concept of an eco system	PO1,2,4,6
4.	Comprehend the definitions, causes and control measures of environmental pollutions	P O 1 ,5
5.	Participate in the environmental issues programmes from the unsustainable to sustainable development	PO 1 , 4,5,6

ENVIRONMENTAL STUDIES

Semester: II **Hours: 2**

Code : 20AE2ES02 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the components of our planet earth.	PSO 1,2,4	K, A ,S
CO - 2	Elucidate the importance of the natural resources.	PSO 2,3,5	K, An, E
CO - 3	Summarise the energy status of the environment.	PSO1,2,5	K,A,An
CO - 4	Acquire knowledge on the conservation of our environment.	PSO1,4,5	K,AP,S
CO - 5	Analyse the significance of water and climate towards sustainable development.	PSO 2,3,5	K,An, Ap, S,E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**ENVIRONMENTAL STUDIES**							**Hours: 2**
Code : 20AE2ES02											**Credits: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	3	4	3	4	5	4	5	4	5	4.09
CO - 2	3	4	3	4	3	4	5	4	4	4	4	3.81
CO - 3	3	4	3	4	3	4	5	4	4	4	4	3.81
CO - 4	3	4	3	4	3	3	5	4	5	5	4	3.90
CO - 5	4	4	3	4	3	4	5	4	4	4	5	4.00
Overall Mean Score for COs												**3.92**

Result: The Score for this Course is 3.92 (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

UNIT I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, scope and importance - Need for public awareness **(2 Hours)**

UNIT II: NATURAL RESOURCES

Classification of Resources: Renewable and non - renewable resources - Forest resources, water resources, mineral resources, food resources, energy resources, Land resources - associated problems; Role of an individual in conservation of natural resources - Equitable use of sources for sustainable life styles. **(8 Hours)**

UNIT III: ECOSYSTEMS

Concept of an ecosystem - Structure and function of an ecosystem - producers, consumers and decomposers - Energy flow in the ecosystem - Food chains, food webs and ecological pyramids - Introduction, types, characteristic features, structure and function of the following Eco system: Forest, grass land, desert and aquatic. **(6 Hours)**

UNIT IV: ENVIRONMENTAL POLLUTION

Definition, Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste management, Role of an individual in prevention of pollution. **(8 Hours)**

UNIT V: SOCIAL ISSUES AND THE ENVIRONMENTS

From unsustainable to sustainable development - Urban problems related to energy Water conservation, rain water harvesting, water shed management, Resettlement and rehabilitation of people, its problem and concerns, case studies, Environmental ethics, Climate change, global warming, acid rain and ozone layer depletion, nuclear accidents and holocaust, case studies. Waste land reclamation. Environmental protection act, air act, water act, wild life protection act. **(6 Hours)**

FIELD WORK

Visit to local area to document environmental assets- river/forest/ grassland/hill/ mountain.

COURSE BOOK:

Murugeshan, R., (2007). Environmental science and Engineering, Millenium publication, Madurai.

UNIT I : Section - 1.1 & 1.2

UNIT II : Section - 1.3 to 1.37

UNIT III : Section - 2.1 to 2.7 & 2.10 to 2.27

UNIT IV : Section - 3.1 to 3.37

UNIT V : Section - 4.1 to 4.17

Note: Tamil Version for Tamil Literature and History Tamil Medium Students.

Continuous Internal Assessment Component (CIA)

Theory:

Component	Marks
Internal test I	40
Internal test II	40
Quiz	10
Assignment	5
Attendance	5
Total	**100**

Continuous Internal Assessment Component (CIA)

Passing Minimum: 40% out of 100

Internal Question Pattern

Part - A

10 Questions × 1Mark =10 Marks

Part - B

2 Questions × 5 Marks = 10 Marks

(Internal Choice)

Part - C

2 Questions × 10 Marks = 20 Marks (2 Questions out of 3)

(Open Choice and atleast one Question from allotted Units)

SKILL ENHANCEMENT COMPULSORY COURSE (SECC -2)
CAPACITY BUILDING

PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Fix healthy attitudes and standards to face the outside world.
2.	Develop healthy interpersonal, intrapersonal and social relationships.
3.	Analyze the portrayal of social issues depicted in films that help them aware of the issues and figure out ways to eliminate them.
4.	Identify the role of social media in the present scenario and adopt the positive changes.
5.	Build up qualities like team work, leadership and problem solving
6.	Improve perspectives on positive thinking, team work, and creativity

PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Develop positive thinking that helps them to set and pursue for meaningful goals.	PO-1, 6
2.	Develop leadership qualities that lead them to inspire and guide people among peer groups and in workplaces.	PO-1, 2, 3, 6
3.	Assess the advantages and disadvantages of social media.	PO-2, 6
4.	Acquiring trade skills by developing social relationships effectively with trade experts.	PO-2,5,6
5.	Understand the portrayal of social causes in films	PO-3

CAPACITY BUILDING

Semester: II **Hours: 2**
Code : 20SE2CB02 **Credit: 2**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO – 1	Realised the importance of physical health, emotional well-being, and stress management.	PSO-1	K
CO – 2	Apply the features of team work and strive to become good leaders.	PSO-2,4	Ap
CO – 3	Enhance their awareness on social media and e- learning.	PSO-3	Sy
CO - 4	Develop interactive skills in online trade, and become value based professionals.	PSO-4	Ap
CO - 5	Acquire film making skills.	PSO-5	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester : II				**CAPACITY BUILDING**							**Hours: 2**
Code : 20SE2CB02											**Credits: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO-1	4	4	4	4	4	5	4	4	5	4	4	4.18
CO-2	4	4	5	4	4	4	4	4	4	4	4	4.09
CO-3	4	3	4	4	4	3	4	4	4	4	4	3.81
CO-4	5	4	4	4	4	3	4	4	5	4	3	4
CO-5	4	4	5	4	4	4	3	4	4	4	4	4
Overall Mean Score												**4.01**

Result: The score for this course is 4.01 (Very high)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

UNIT I

Positive thinking-Seven steps in dealing with doubts. Traits of positive thinking. Goal setting-techniques of positive thinking to achieve the goals-creativity and components of creativity (6 Hours)

UNIT II

Leadership - Types of Leadership - Team work and public speaking - Importance of maintaining good interpersonal relationship with Team - Motivation - Self confidence - Attitude - Working in Group - Time Management - Effective Planning. (6 Hours)

UNIT III

Skilful usage of Social media (Whatsapp, Twitter, Facebook, Instagram, other app). Cyber bulling, photo, video morphing & editing, fake news. Useful study apps, e learning apps, Health, Police, Lawyer help app, Social issues complaint app. (6 Hours)

UNIT IV

Online interaction with Experts – Mushroom Cultivation – Mrs. Arthi (Batlagundu) –Apiculture –Mrs. Josephine (Madurai), Garment making – Mr. Alagusundaram (Tirupur) - Terrace Garden – Mrs. Megala – (Madurai) – Spirulina Cultivation - D. Aarthi (Madurai) – Antenna Foundation, (Madurai) (6 Hours)

UNIT V

Film Review: Thani Oruvan , Peranmai, Dhangal, 36 Vayadhinile, Kaatrin Mozhi, Ratchasi, English Vinglish - Short Film Making–Submission of Short Flim. (6 Hours)

BOOKS FOR REFERENCE:

1. Power of positive thinking, Mile, D.J.Rohan Book Company Delhi, 2004.
2. Dolmans 1922, A Handbook Public Speaking 1922, New York, Harcourt Breaee and company.

1. http://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/positive-thinking/art-20043950.
2. http://mayoclinic.org/healthy-lifestyle/stress-management/in-depth/3-simple-strategies-to-help-you-focus-and-de-stress/art-20390057.
3. http://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/3-ways-to-become-more-stress-resilient/art-20267213
4. http://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/3-ways-to-learn-patience-and-amp-up-your-well-being/art-20390072
5. http://www.mayoclinic.org/4-proven-ways-you-can-feel-happier/art-20390079

6. http://mayoclinic.org/healthy-lifestyle/adult-health/in-depth/anger-management/art-20048149
7. http://www.gaiam.com/blogs/discover/positive-thinking-strategies-to-help-you-achieve-yourgoals#:-text=Focus%20on%20what's20%20of20old%20failures.
8. http://www.linkedin.com/pulse/what-makes-positive-attitude-10-components-gary
9. http://ifflab.org/how-to-prevent-cyber-bullying -anti-cyber-bullying-law-in- india/
10. http://www.sciencedaily .com/terms/morphing.htm#:text=Morphing%20 is %special %effect,little%20 instruction%20 from%20the %20 user.
11. http://www.educationalappstore.com/
12. http:// www.mobihealthnews.com/37340/38-more-health-and-wellness-apps-that-connect-to-apples-healthkit
13. http://www.youtube.com/watch?v=skfqt9mm7j4
14. http://www.youtube .com/watch?v-rvy44i-ciE
15. https://www.youtube.com.com/watch?v=rINOELMCiqc
16. http:// www.youtube.com/watch?v=N5R-KCWPzr0&list=PLHw83Z MxtQ9 NdRd5yAxYrxkRsxqcvw iae@index=3
17. http://www.youtube.com/watch?v=PUzaLjSjERE
18. http:// www.youtube.com/watch?v=QkVue8XmVr8
19. http:// www.youtube.com/watch?v=XcRs4JBN43o
20. http:// www.youtube.com/watch?v=dzvpQG-2xC4

Continuous Internal Assessment Component (CIA)

Theory:

Component	Marks
Internal test I	40
Internal test II	40
Quiz	10
Assignment	5
Attendance	5
Total	**100**

Continuous Internal Assessment Component (CIA)

Passing Minimum: 40% out of 100

Internal Question Pattern

Part - A

10 Questions × 1Mark =10 Marks

Part - B

2 Questions × 5 Marks = 10 Marks
(Internal Choice)

Part - C

2 Questions × 10 Marks = 20 Marks (2 Questions out of 3)
(Open Choice and atleast one Question from allotted Units)

பொதுத்தமிழ் - காப்பிய இலக்கியம்

பருவம்: மூன்று **நேரம்: 6**

குறியீடு: 20GT3GS03 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	காப்பிய இலக்கியங்களின் சிறப்புக்களை அறிந்து கொள்வர்.	PSO - 1, PSO - 2	புரிதல், அறிவு
CO - 2	ஐம்பெரும் காப்பியங்கள், பிறகாப்பியங்களின் பக்திச்சிறப்புக்களை உணர்ந்து கொள்வர்.	PSO - 1, PSO - 2	புரிதல்
CO - 3	அகப்புற இலக்கியச் செய்திகளை அறிந்து கொள்வர்.	PSO - 1, PSO - 2	அறிவு
CO - 4	வணிகச் செய்திகளைத் தெரிந்து கொள்வர்.	PSO - 2	புரிதல், பயன்படுத்துதல்
CO - 5	தமிழிலக்கியத்தில் காணலாகும் அறவியல், அறிவியல் செய்திகளைத் தெரிந்து கொள்வர்.	PSO - 2	அறிவு

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III			பொதுத்தமிழ் - காப்பிய இலக்கியம்								**Hours: 6**
Code : 20GT3GS03											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	3	3	4	3	3	3	3	2	5	3	3.18
CO - 2	3	3	3	3	3	4	3	3	2	5	3	3.18
CO - 3	3	3	3	3	3	4	3	3	3	3	4	3.18
CO- 4	3	2	3	3	3	3	5	2	2	3	3	3.27
CO - 5	3	3	3	3	3	3	3	5	2	2	3	3
Overall Mean Score												**3.16**

Result: The score for this course is **3.16** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

அலகு 1

சிலப்பதிகாரம் - புகார்க்காண்டம் - வேனில் காதை

மணிமேகலை - சிறைக்கோட்டம் அறக்கோட்டம் ஆக்கிய காதை

வளையாபதி - 3 முதல் 12 பாடல்கள்

அலகு 2

தேம்பாவணி - எசித்து சேர்படலம் - முதல் 15 பாடல்கள் மட்டும்

சீறாப்புராணம் - சாபீர் கடன்றீர்த்த படலம் - (23 பாடல்கள்)

அலகு 3

பொருளிலக்கணம் - அகத்திணை, புறத்திணை

இலக்கிய வரலாறு - காப்பியம் தொடர்பான இலக்கிய வரலாறு

அலகு 4

வணிகத் தமிழ் - சங்க இலக்கியங்கள் உணர்த்தும் வணிகச் செய்திகள்
பக். 75 - 84

வணிகக் கலைச் சொல்லாக்கம் - 50 சொற்கள்

அலகு 5

அறிவியல் தமிழ் - தமிழில் அறிவியல் - பக். 27 - 40

பாட நூல்கள்

1. தமிழ்த்துறை வெளியீடு - ஜெயராஜ் அன்னபாக்கியம் மகளிர் தன்னாட்சிக் கல்லூரி, பெரியகுளம்.
2. கி. இராசா - தமிழ் இலக்கிய வரலாறு
   நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்,
   அம்பத்தூர், சென்னை - 98
   இரண்டாம் பதிப்பு - 2019.

பார்வை நூல்கள்

1. பா. சரவணன் - **சிலப்பதிகாரம்,** சந்தியா பதிப்பகம், சென்னை. 8
   2 ஆம் பதிப்பு - ஜனவரி - 1997.
2. இராம - லட்சுமணன் - **மணிமேகலை,** உமா பதிப்பகம், சென்னை 1
   2 - ஆம் பதிப்பு - 1998.
3. முனைவர் கமலாமுருகன் - **வளையாபதி குண்டலகேசி மூலமும் உரையும்**
   சாரதா பதிப்பகம்,
   சென்னை - 600 014.
4. போரா ந.ம.மரிய அருட்பிரகாசம் (தொ.ஆ) - **தேம்பாவணி**
   மாவிகா அச்சகம், கே. புதூர்,
   மதுரை.
5. செய்குதம்பி பாவலர் - **சீறாப்புராணம்,** யூனிவர்சல் பிரிண்டர்ஸ்,
   வடக்கு உஸ்மான்சாலை, சென்னை
   டிசம்பர் - 2014
6. முனைவர் ச. திருஞான சம்பந்தம் - **யாப்பருங்கலக்காரிகை,** கதிர் பதிப்பகம்,

திருவையாறு, முதற் பதிப்பு - 2007

7. எம். ஆர். அடைக்கலசாமி - **இலக்கிய வரலாறு,** ராசி பதிப்பகம், சென்னை. முதற்பதிப்பு. 1960

8. மணவை முஸ்தபா - **காலம் தேடும் தமிழ்,** மீரா பதிப்பகம், சென்னை - 40. 1993

9. முனைவர். பொ. மா. பழனிச்சாமி - **இலக்கியக் கதிர்** நியூ செஞ்சுரி புக்ஹவுஸ் சென்னை - 40. முதற்பதிப்பு - 2010

10. நாராயண வேலுப் பிள்ளை - **உரைநடைத் தமிழ், ஐம்பெருங் காப்பியங்கள்,** நர்மதா பதிப்பகம், சென்னை - 108. ஆறாம் பதிப்பு - 2003

INORGANIC AND ORGANIC CHEMISTRY

Semester: III **Hours: 6**

Code : 20CH3MC03 **Credits: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Predict the general characteristics of 'p' block elements	PSO - 1, PSO - 2	K, C
CO - 2	Describe the different types of hybridisations	PSO - 1	Ap
CO - 3	Recognize the crystal structure and metallic Bonding	PSO - 4	K, An
CO - 4	Describe the various concepts in stereochemistry	PSO - 1, PSO - 4	C
CO - 5	Acquire knowledge about conformational analysis of organic compounds	PSO - 1, PSO - 3	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**INORGANIC AND ORGANIC CHEMISTRY**							**Hours: 6**
Code : 20CH3MC03											**Credits: 6**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	1	2	3	4	5	6	1	2	3	4	5	3.18
CO - 2	4	4	4	4	3	2	2	4	2	3	3	3.45
CO - 3	4	4	4	4	3	3	4	4	3	3	4	3.63
CO - 4	4	4	4	4	2	2	3	4	2	4	4	3.45
CO - 5	4	4	4	4	3	3	3	4	4	4	3	3.63
Overall Mean Score												**3.468**

Result: The score for this course is **3.468** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

p-BLOCK ELEMENTS:

Introduction - metallic character-melting and boiling points - oxidising and reducing properties - electrode potentials and electropositive character - oxidation states - general characteristics of group 13 elements - diagonal relationship between boron and silicon - general characteristics of group 14 elements - allotropy of carbon: structure of diamond and graphite - comparison of carbon with silicon - general characteristics of group 15 elements - difference between nitrogen and the rest of the family members - general characteristics of group 16 elements: anomalous behavior of oxygen **(18 Hours)**

UNIT II

CHEMICAL BONDING:

Introduction - Lewis concept - atomic orbital theory of covalent bond - variable , maximum covalency - characteristics, polarity of covalent bonds - valence bond theory - limitation of valence bond theory - overlap of orbitals, s-s, s-p and p-p overlap - sigma and pi bonds - resonance - hybridization: sp, sp^2, sp^3, sp^3d, sp^3d^2 and sp^3d^3 with suitable examples - VSEPR theory: geometry of covalent molecules and ions: $BeCl_2$, BF_3, CH_4, PF_5, SF_6, IF_7, NO_3^-, ClO_4^-, $SnCl_2$, H_2O, NH_3 and XeF_2 limitations of VSEPR theory - molecular orbital theory - combination of atomic orbitals to form molecular orbitals - difference between bonding and antibonding molecular orbitals - condition for the combination of atomic orbitals - bond order - MO diagram for simple homo and hetero nuclear diatomic molecules : H_2, H_2^+, He_2, N_2, F_2, O_2, CN, CO and NO - difference between VBT and MOT - structure of multicenter bonding **(18 Hours)**

UNIT III

IONIC SOLIDS AND WEAK INTERACTIONS:

General characteristics of ionic solids - factors influencing the formation of ionic bond - radius ratio rule - limitations - structures of ionic crystals - AX type: ZnS, CsCl - AX_2 type: CaF_2, TiO_2 - Born Lande equation - lattice energy - Born-Haber Cycle - applications of Born-Haber Cycle - Fajan's rules - imperfections in a crystal: lattice defects - Schottky defects - Frenkel defects - consequences of Schottky and Frenkel defects - difference between Schottky and Frenkel defects - metal excess and deficiency defects - metallic crystals - weak interactions: hydrogen bond, van der Waals forces **(18 Hours)**

UNIT IV

STEREOCHEMISTRY OF ORGANIC COMPOUNDS I:

a) Geometrical isomerism

Definition and types of isomerism - stereoisomerism: geometric isomerism in alkenes - causes of geometric isomerism - geometric isomerism of maleic and fumaric acids - determination of configuration of geometric isomers: method of cyclization, by chemical correlation, dipole moment measurement- E and Z system of nomenclature - geometric isomerism in oximes, alicyclic compounds

b) Optical isomerism

Definition - cause of optical activity - asymmetric carbon atom - molecular chirality - test for chirality - elements of symmetry - enantiomers: criteria for enantiomerism, properties of enantiomers - diastereomers - erthro and threo configurations - meso compounds-atropisomerism in biphenyls. **(18 Hours)**

UNIT V

STEREOCHEMISTRY OF ORGANIC COMPOUNDS II:

a) CONFIGURATION:

Relative configuration - absolute configuration - configuration of molecules with one asymmetric and two asymmetric carbon atoms - racemization - inversion of configuration (Walden inversion) - retention of configuration - resolution of racemic mixture: mechanical separation, bio chemical method chemical method, chromatography and kinetic method- asymmetric (stereogenic) synthesis: with optically active reagents, enzymes and circularly polarsied light.

b) CONFORMATION:

Conformation of ethane, 1,2 dichloro ethane and butane - Fischer's plane projection formula - Sawhorse formula - Newmann's projection formula - conformation of cyclohexane - conformations of disubstituted cyclohexanes - differences between conformation and configuration **(18 Hours)**

COURSE BOOKS:

1. B.R. Puri, L.R. Sharma and K.C. Kalia, Geetanjli Kaushal, Graduate Inorganic Chemistry, Vol-I, Vishal Publishing Co., **Unit I-III**
2. M.K. Jain, S.C. Sharma, Fateh Bahadur, Graduate Organic Chemistry, Vol-I, Vishal Publishing Co., **Unit IV and V**

BOOKS FOR REFERENCE:

1. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Milestone Publishers and Distributor, Delhi, 32nd edition, 2015.
2. P. L. Soni and Mohan Katyal, Text book of Inorganic Chemistry, Sultan Chand and Sons Educational Publishers, Reprint, 2014.
3. R.D. Madan, Modern Inorganic Chemistry, S. Chand and Company Ltd., 2nd edition, 2002.
4. M.K. Jain and S.C.Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th edition, 2014
5. P.L. Soni and H.M. Chawla, Text book of Organic Chemistry Sultan Chand and Sons, Reprint, 2014.
6. K.S. Tewari and N. K. Vishnoi, A Text book of Organic Chemistry, Vikas Publishing House Pvt. Ltd., 3rd edition, 2011.

PRACTICAL: MICROSCALE ANALYSIS OF ORGANIC SUBSTANCES

Semester: III **Hours: 3**

Code : 20CH3CP02 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognize the principles of organic qualitative analysis	PSO - 2	U, An
CO - 2	Analyze various organic compounds using documented procedures	PSO - 1	U, An
CO - 3	Detect the presence of special elements such as nitrogen and sulphur	PSO - 3	U, An
CO - 4	Identify the functional groups of an organic substance by characteristic tests	PSO - 3	U, E
CO - 5	Apply skills on systematic microscale analysis and preparation of solid derivative	PSO - 5	U, An, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				PRACTICAL: MICROSCALE ANALYSIS OF ORGANIC SUBSTANCES							Hours: 3
Code : 20CH3CP02											Credits: 2
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	4	5	3	4	4	3	3	4	3	3	3	3.55
CO - 2	4	4	4	3	3	3	4	4	3	4	3	3.55
CO - 3	4	2	3	3	3	2	3	4	3	3	3	3
CO - 4	5	3	4	3	4	3	3	4	4	3	3	3.55
CO - 5	4	4	4	3	3	3	4	5	3	3	3	3.55
Overall Mean Score												3.44

Result: The score for this course is **3.44** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

Microscale analysis of the organic compounds containing one or two functional groups:

Acids, phenols, aldehydes, ketones, esters, nitro compounds, amines (primary, secondary and tertiary), amides (mono and di), anilides and carbohydrates. The compound is identified as

i) Aliphatic or aromatic

ii) Saturated or unsaturated

iii) Special elements present/absent

iv) Nature of functional group

v) The functional group is confirmed by the preparation of a solid derivative

BOOK FOR REFERENCE:

Practical manual prepared by the Department of Chemistry

ALLIED PHYSICS THEORY - I

MECHANICS, PROPERTIES OF MATTER AND THERMAL PHYSICS

Semester: III **Hours: 3**

Code : 20PH3AC01 **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	Explain the types of forces and energy.	PSO - 1	K, U
CO-2	Describe the kinematics of rotational motion.	PSO - 1	K, U
CO-3	Explain the fundamental laws of gravitation and determination.	PSO - 1	K,U
CO-4	Determine the moduli of elasticity through experimental learning.	PSO - 1, 2	U, An
CO-5	Analyze the various laws of heat transfer and its applications.	PSO - 1, 2, 3	U, An, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				ALLIED PHYSICS THEORY - I MECHANICS, PROPERTIES OF MATTER AND THERMAL PHYSICS							Hours:3
Code : 20PH3AC01											Credits:3
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO-1	5	4	4	3	3	3	5	4	4	4	3	3.81
CO-2	5	4	3	4	3	3	5	4	4	3	4	3.81
CO-3	5	4	4	4	3	3	5	3	4	4	3	3.81
CO-4	5	4	4	3	3	3	5	5	3	3	4	3.81
CO-5	5	3	4	4	3	3	5	5	5	4	3	4
Overall Mean Score												3.84

Result: The score for this course is **3.84** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I: FORCE, WORK, POWER AND ENERGY

Newton's law gravitation - Coulomb's law - Central Forces - Conservative Forces - Non-Conservative Forces - Friction - Limiting friction, Coefficient of Friction and Angle of Friction - Laws of Friction - Motion of bodies along an inclined plane - Work - Work done by a varying force - Energy - K.E Potential Engery - Power. **(9 Hours)**

UNIT II: ROTATIONAL MOTION

Angular velocity - Angular acceleration - Narmal Acceleration - Centripetal Force - Centrifugal Forece - Torque and angular momentum - Expression for Torque in Rotational Motion - Expression for Angula momentum of a Rotating Rigid body - Kinetic energy of rotation - Expression for work in rotational motion - Expression for power in rotation motion - Moment of inertia - Perpendiuclar axes Theorem - Theoren of parallel axes - Moment of inertia of thin circular ring - Moment of inertia of a solid sphere - M.I of a Hollow sphere about its Diameter. **(9 Hours)**

UNIT III: GRAVITATION

Kepler's laws ofplanetary motion - Newton's law of gravitation - Mass and Density of the Earth - Determnation of G-Boys 'Method - The compound pendulum - Variation of g with latitude or rotation of the earth - Variation of g with altitude - Variation of g with depth - Artifical Satellites. **(9 Hours)**

UNIT IV: ELASTICITY AND VISCOSITY

Different Moduli of Elasticity - Poission's Ratio - Bending of Beams - Expression for the bending moment - depression of the loaded end of the cantilever - Determination of Young's modulus by Uniform Bending - Determination of Young's modulus by Non-Uniform Bending - I Section Girders - Torsion of a Cylinder - Work done in Twisting - Torsional oscillation of a body - Rigidity modulus by torsion Pendulum.

VISCOSITY:

Derivation of Poiseuille's Formula - Poiseuille's method for determining coefficient of viscosity of a liquid - Equation of continuity - Bernoulli's Theorem - Applications of Bernoulli's Theorem - Pitot Tube. **(9 Hours)**

UNIT V:

Thermal conductivity - Lee's disc method- Analogy between Heat flow and Electric current - Wiedemann - Franz Law- Convection in the atmosphere - Lapse rate - Stefan's Law - Determination of solar constant - Water flow pyrheliometer- Temperature of the sun-Wien's displacement law - Solar spectrum - Energy distribution in Black Body Spectrum-Statement of Planck's law of radiation - Wien's Law - Rayleigh-Jeans law. **(9 Hours)**

BOOKS FOR STUDY:

1. R. Murugeshan - Mechanics, Properties of Matter and Sound - Ist Edition Jun 2012 - Annai Print Park, Madurai.
2. R. Murugeshan - Thermal physics - Ist Edition Sep. 2007-Vivekanada Press, Madurai.

COURSE BOOKS:

1. R. Murugeshan - Mechanics, Properties of Matter and Sound - Ist Edition Jun 2012 - Annai Print Park, Madurai.
2. R. Murugeshan - Thermal physics - Ist Edition Sep. 2007-Vivekanada Press, Madurai.

DETAILED REFERENCE:

1. R. Murugeshan - Mechanics, Properties of Matter and Sound - Ist Edition Jun 2012 - Annai Print Park, Madurai.

   UNIT I : Chapter-1: All sections

   UNIT II : Chapter-2: All sections

   UNIT III : Chapter-3: All sections

   UNIT IV : Chapter-4: All sections

   Chapter-5: All sections
2. R. Murugeshan - Thermal physics - Ist Edition Sep. 2007-Vivekanada Press, Madurai.

   UNIT V : Chapter-3: 3.1 - 3.4 chapter 4: 4.1- 4.3 Chapter-5: All Sections

ALLIED PHYSICS PRACTICAL - I

Semester: III **Hours: 2**

Code : 20PH3AP01 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	Determine moduli of elasticity through experiments.	PSO - 3	Ap
CO-2	Determine the parameters of mechanics through experiential learning.	PSO - 3	Ap
CO-3	Perform and verify the fundamental laws of sound.	PSO - 3	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**ALLIED PHYSICS PRACTICAL - I**							**Hours: 2**
Code : 20PH3AP01											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO-1	4	5	5	2	2	2	4	4	5	3	2	3.45
CO-2	4	5	5	2	2	2	4	4	5	3	2	3.45
CO-3	4	5	5	2	2	2	4	4	5	3	2	3.45
Overall Mean Score												**3.45**

Result: The score for this course is **3.45** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

LIST OF PRACTICALS (Any Six)

1. Determination of Young's Modulus of the material of the beam by uniform bending method - Pin and Microscope.
2. Determination of Young's Modulus of the material of the beam by uniform bending method - Optic lever- Telescope and Scale method.
3. Determination of Young's Modulus of the material of the bar by Non Uniform Bending method - Optic Lever - Telescope and Scale method.
4. Determination of Young's Modulus of the material of the bar by Non Uniform Bending method - Pin and Microscope.
5. Determination of rigidity modulus of a wire using Torsion Pendulum.
6. Determination of 'g' using Compound Pendulum.
7. Determination of thermal conductivity of a bad conductor - Lee's Disc Method.
8. Determination of co-efficient of viscosity of a highly viscous liquid- Stoke's Method.
9. Verification of laws of transverse vibrations of stretched strings by Sonometer.
10. Determination of surface tension of a liquid - Drop weight method.
11. Determination of surface tension of a liquid - Capillary rise method.

ELECTROCHEMISTRY

Semester: III **Hours: 4**

Code : 20CH3DE1A **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge about the mobility of ions and the related terms.	PSO - 1	K, C
CO - 2	Explain the laws of electrochemistry and their applications.	PSO - 1, PSO - 2	K, Ap
CO - 3	Appreciate the theories of electrochemistry.	PSO - 2	K, An
CO - 4	Recall the different type of cells and electrodes.	PSO - 1, PSO - 4	C, Ap
CO - 5	Relate the applicability of EMF and to outline the fundamentals of corrosion.	PSO - 2, PSO - 4	An, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**ELECTROCHEMISTRY**							**Hours: 4**
Code : 20CH3DE1A											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	3	4	4	3	4	4	5	4	4	3.91
CO - 2	4	3	4	3	4	3	4	4	5	4	4	3.81
CO - 3	3	4	4	3	4	4	3	4	4	3	4	3.73
CO - 4	3	3	4	3	4	3	4	4	3	3	4	3.45
CO - 5	4	3	5	3	3	3	4	4	3	3	4	3.54
Overall Mean Score												**3.69**

Result: The score for this course is **3.69** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

ELECTROCHEMISTRY I:

Electrical transport - conduction in metals and electrolytic solutions - electrolytic conduction: specific conductance and equivalent conductance - relation between specific conductance and equivalent conductance - molar conductance, cell constant and its determination - variation of equivalent, specific, and molar conductances with dilution - migration of ions - discharge of ions on electrolysis - transport number - definition - determination of transport number by Hittorf's method and moving boundary method **(12 Hours)**

UNIT II

ELECTROCHEMISTRY II:

Kohlrausch law: law of independent migration of ions - calculation of molar ionic conductance - relation between molar ionic conductance and ionic mobility - application of Kohlraush's law - applications of conductance measurements: determination of degree of dissociation of weak electrolytes, determination of dissociation constant(K_a) of weak acids, determination of ionic product of water(K_w), determination of solubilities and solubility products of sparingly soluble salts - conductometric titrations - advantages of conductometric titrations **(12 Hours)**

UNIT III

THEORIES OF ELECTROLYTIC DISSOCIATION:

Arrhenius theory of electrolyte dissociation - factors controlling degree of dissociation - limitations - Oswald's dilution law - experimental verification - importance - limitations - strong electrolytes: Debye-Huckle-Onsager's equation of strong electrolytes - ionic atmosphere - asymmetry effect - electrophoretic effect - viscous effect - verification - significance **(12 Hours)**

UNIT IV

ELECTROCHEMICAL CELLS:

Electrolytic cells - galvanic cells: zinc-copper cell (Daniell cell), copper-silver cell - difference between galvanic cell and electrolytic cell - EMF of a cell - standard cell - reversible and irreversible cells: metal - metal ion electrods, amalgam electrode, gas electrodes, metal-metal insoluble electrode (calomel electrode), oxidation reduction electrodes, single electrode potential - thermodynamics of reversible cells and reversible electrodes: electrical energy and free energy **(12 Hours)**

UNIT V

a) ELECTRO MOTIVE FORCE (EMF):

EMF and Equilibrium constant(K)of a cell reaction - Nernst equation - concentration cells - electrode concentration cells without transference - electrolyte concentration cells without transference - concentration cells with transference - Liquid Junction Potential(E_{LJP}), electrolyte concentration cells with salt bridge - applications of EMF measurements - determination of activity coefficients of electrolytes - determination of transport number - determination of pH of a solution using hydrogen electrode, quinhydrone electrode and glass electrode - potentiometric titrations

b) CORROSION:

Definition - types - theories of corrosion - prevention methods of corrosion **(12 Hours)**

COURSE BOOK:

B.R. Puri, L.R.Sharma, Madan. S Pathaniya and B..S.. Lark, Graduate of Physical Chemistry(Volume II), Vishal Publishing Co., **Unit I-V**

BOOKS FOR REFERENCE:

7. B.R. Puri, L.R. Sharma and S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 47th edition, 2016
8. Arun Bahl, B.S. Bahl and G.D. Tuli, Essential of Physical Chemistry, S. Chand and Company Pvt. Ltd., Reprint, 2014

DAIRY CHEMISTRY

Semester: III **Hours: 4**

Code : 20CH3DE1B **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge about composition of milk and milk products.	PSO - 1	K, U
CO - 2	Gain knowledge on the processing of milk	PSO - 2	K, U
CO - 3	Explain the methods of analysis in milk adulteration.	PSO - 2	C, Ap
CO - 4	Describe the composition to prepare milk products.	PSO - 2	U
CO - 5	Analyze milk and milk products.	PSO - 3	U, Ap, An
CO - 6	Demonstrate the analysis of milk and milk products.	PSO - 3	U, Ap, An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**DAIRY CHEMISTRY**								**Hours: 4**
Code : 20CH3DE1B												**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	4	3	4	4	3	4	3	4	4	3	3.55
CO - 2	4	4	3	4	3	4	3	3	4	4	3	3.55
CO - 3	3	4	4	3	4	3	3	3	4	3	4	3.45
CO - 4	4	4	4	3	3	4	3	4	4	4	3	3.63
CO - 5	4	4	4	4	3	3	4	4	4	4	3	3.73
Overall Mean Score												**3.58**

Result: The score for this course is **3.58** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I

COMPOSITION OF MILK:

Milk: definition and composition - minor components of milk: salts and ash - trace elements - radioactive trace elements and gases - other components of milk: flavoring substances, phospholipids, sterols, carbohydrates other than lactose, vitamins and pigments - milk grades - constituents of milk: lipids, proteins, carbohydrates, vitamins and minerals - types of milk and milk products

(12 Hours)

UNIT II

PROCESSING OF MILK:

Microbiology of milk - destruction of micro organisms - physico-chemical changes - types of pasteurization: bottle batch, high temperature and short time ultra high temperature pasteurization **(12 Hours)**

UNIT III

MILK ADULTERATION:

Special tests - cane sugar - gelatin and calcium sucrate - preservatives - pasteurized milk - composition of milk - standard milk - detection of skimmed milk cream - forms of adulteration - methods of analysis - homogenized cream - reconstituted cream - condensed milk **(12 Hours)**

UNIT IV

COMPOSITION OF MILK PRODUCTS:

Introduction - market milk - fermented milk - market cream - butter- butter oils - spreads - concentrated milk products - dried milk products - cheese - frozen desserts - casein - lactose - whey - specialty products **(12 Hours)**

UNIT V

ANALYSIS OF MILK AND MILK PRODUCTS:

Determination: total solids, total acidity and lactose - physical properties of milk: colour, odour, acidity, specific gravity, viscosity and conductivity **(12 Hours)**

BOOKS FOR REFERENCE :

1. Webb Johnson and Alford, Fundamentals of Dairy Chemistry, CBS Publishers & Distributors, 2nd edition, 1987, **Unit I and IV**
2. B. Sivasankar, Food processing & preservation, Prentice-Hallmof India Pvt. Ltd., 3rd edition, 2005, **Unit I**
3. A.G. Woodman, Food Analysis, Axis Books (India),1st edition,2010, **Unit I and III**
4. Kavitha Marwaha, Food Process Engineering, Gene-Tech Books, 2010, **Unit II**
5. Alex V.Ramani, Food Chemistry, MJP Publishers, 2009, **Unit V**

SOIL AND AGRICULTURE CHEMISTRY

Semester: III **Hours: 4**
Code : 20CH3DE1C **Credits: 3**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Realize the composition of soil and its importance to agriculture	PSO - 2	K
CO - 2	Demonstrate the properties of soil	PSO - 3	U, Ap
CO - 3	Discuss the various types of micronutrients needed to the soil	PSO - 3	U, C
CO - 4	Analyse the chemical composition of fertilizer and soil	PSO - 4	U, An
CO - 5	Formulate the methods of analyzing the soil	PSO - 5	Ap, An, S

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III			SOIL AND AGRICULTURE CHEMISTRY						Hours: 4		
Code : 20CH3DE1C											Credits: 3
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	4	4	4	3	3	3	3	4	4	4	3	3.54
CO - 2	4	4	4	3	3	4	3	3	3	4	4	3.54
CO - 3	3	4	3	4	3	3	3	4	4	4	4	3.54
CO - 4	3	4	4	3	4	4	4	3	3	4	4	3.63
CO - 5	3	4	4	3	4	3	4	4	3	4	3	3.54
Overall Mean Score												3.56

Result: The score for this course is **3.56** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I: SOIL COMPONENTS:

Definition - volume, composition - uses - mineral soil - chemical ions - soil colloids - importance - nature - properties of inorganic and organic soil colloid - general characteristics - properties and importance - types - silicate clays - silicates - silicon oxygen tetrahedron. **(12 Hours)**

UNIT II: SOIL SALINITY AND ALKALINITY:

Saline and alkaline soil - nature - classification - characteristics - formation of saline and alkaline soil - effects - quality of irrigation water: introduction - criteria -irrigation water resources - water quality - classification of water. **(12 Hours)**

UNIT III: FERTILIZERS:

Introduction - methods of applying fertilizers - application of fertilizer in solid form - liquid fertilizer - nitrogenous fertilizer - types - phosphatic fertilizers: forms - classification- potassic fertilizers: Potassium sulphate: production - properties **(12 Hours)**

UNIT IV

a) BIOFERTILIZERS:

Soil biota in sustainable agriculture - biodiversity - management strategies - comparison of chemical fertilizer and biofertilizer.

b) VERMICOMPOSTING:

Economic implications - materials - preliminary treatment - types of vermicomposting - requirements for vermicomposting.

Eco-Friendly Farming System: organic farming - concept - options **(12 Hours)**

UNIT V: ANALYSIS OF SOIL

i) Estimation of Ca, Mg, K and nitrate

ii) Analysis of soluble salt.

iii) Analysis of NPK in fertilizer.

iv) Determination of soil pH and electrical conductivity.

v) Estimation of organic matter content of soil. **(12 Hours)**

COURSE BOOKS:

1. Shivanand Tolanur, Soil Chemistry, International Book Distributing Co., 1st edition, 2006. **(Unit I and II)**
2. P.K.Gupta, A Handbook of Soil, Fertilizer and Manure, Agrobios (India), 2nd edition, 2012. **(Unit III and IV)**
3. A. K. Mani, R. Santhi and M. Sellamuthu, A Handbook of Laboratory Analysis, AE Publication, Coimbatore, 2007. **(Unit V)**

BOOKS FOR REFERENCE:

1. S. P. Majumdar and R. A. Singh, Analysis of Soil Physical Properties, Agrobios (India), 2012.
2. Pooja Kashyap, Agricultural Chemistry, Rajat Pubublications, New Delhi, 1st Published, 2009.

பொதுத்தமிழ் - பழந்தமிழ் இலக்கியம்

பருவம்: நான்கு **நேரம்: 6**

குறியீடு: 20GT 4GS04 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	பழந்தமிழ் இலக்கிய வளங்களை அறிந்து கொள்வர்.	PSO - 2	அறிவு
CO - 2	பழந்தமிழ் இலக்கியங்களின் சமூகநிலையைப் புரிந்து கொள்வர்.	PSO - 2	புரிதல், அறிவு
CO - 3	பழந்தமிழ் இலக்கியத்தின் தனித்தன்மையை அறிந்து கொள்வர்.	PSO - 2	அறிவு
CO - 4	பழந்தமிழ் இலக்கியத்தில் காணப்படும் நயங்களைத் தெரிந்து கொள்வர்.	PSO - 2	புரிதல்
CO - 5	பழந்தமிழ் இலக்கிய ஆசிரியர்களை அடையாளம் காண்பர்.	PSO - 2	பயன்படுத்துதல்

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				பொதுத்தமிழ் - பழந்தமிழ் இலக்கியம்							**Hours: 6**
Code : 20GT 4GS04											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	3	3	3	3	4	3	3	3	3	3	3.09
CO - 2	3	3	3	4	3	4	4	3	3	4	2	3.27
CO - 3	3	3	3	3	3	3	3	3	3	3	4	3.09
CO- 4	3	4	3	3	3	3	3	3	3	3	3	3.09
CO - 5	3	3	3	3	3	3	3	3	3	3	3	3.00
Overall Mean Score												**3.10**

Result: The score for this course is **3.10** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

அலகு 1: சங்க இலக்கியங்கள் - எட்டுத்தொகை

1. **நற்றிணை (2 பாடல்கள்)**

"கேளாய், எல்ல தோழி..." (குறிஞ்சி: பாடல் - 61)

"பிரசம் கலந்த வெண் சுவைத் தீம்பால்..." (பாலை: பாடல் - 110)

2. **குறுந்தொகை (5 பாடல்கள்)**

"நெய்கனி குறும்பூழ்க்....." (குறிஞ்சி: பாடல் - 389)

"ஊருண் கேணி....." (மருதம்: பாடல் - 399)

"நசைபெரி துடையர்....." (பாலை: பாடல் - 37)

"பூவிடைப் படினும் யாண்டு....." (நெய்தல்: பாடல் - 57)

"மழைவிளை யாடும் ....." (முல்லை: பாடல் - 108)

3. **கலித்தொகை (1 பாடல்)**

"உண்கடன் வழிமொழிந்து இரங்குங்கால்....." - பாலைக்கலி - தோழிக்கூற்று

4. **அகநானூறு (2 பாடல்கள்)**

"வான் கடற் பரப்பில் தூவற்கு எதிரிய....." (நெய்தல்: பாடல் - 10)

"யாயே கண்ணினும் கடுங் காதலே! ....." (குறிஞ்சி: பாடல் - 12)

5. **புறநானூறு (2 பாடல்கள்)**

"அரிமயிர்த் திரள் முன்கை....." (பாடல்: 11)

"பாணர் தாமரை மலையவும், புலவர்....." (பாடல்: 12)

அலகு 2: பத்துப்பாட்டு

நெடுநல்வாடை முழுவதும்

அலகு 3: நீதி நூல்கள்

1. **திருக்குறள்** : **அறத்துப்பால்** - செய்நன்றி அறிதல் - ஈகை

2. **நாலடியார் : பொருட்பால்**

கல்வி - "குஞ்சி யழகும்..." முதல் "அலகுசால் கற்பின் ---" வரை (10 பாடல்கள்)

அறிவுடைமை - "பகைவர் பணிவிடம்..." முதல் "கருமமு முட்படா --" வரை (10 பாடல்கள்)

அலகு 4: இலக்கணம்

வல்லெழுத்து மிகும் இடம், மிகா இடம்

அலகு 5: இலக்கிய வரலாறு

சங்க காலம், சங்கம் மருவிய காலம் தொடர்பான இலக்கிய வரலாறு.

பாடநூல் :

1. தமிழ்த்துறை வெளியீடு - ஜெயராஜ் அன்னபாக்கியம் மகளிர் கல்லூரி. பெரியகுளம்.

2. கி. இராசா - தமிழ் இலக்கிய வரலாறு
நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்,
அம்பத்தூர், சென்னை - 98
இரண்டாம் பதிப்பு - 2019.

பார்வை நூல்கள்:

1. வ.த. இராமசுப்பிரமணியம் (உ.ஆ) - **நற்றிணை**
   திருமகள் நிலையம்,
   முதற் பதிப்பு - 2009.

2. புலவர் துரை இராசாராம் (உ.ஆ) - **குறுந்தொகை**
   திருமகள் நிலையம்,
   சென்னை. முதற் பதிப்பு 2008

3. முனைவர்.அ.விசுவநாதன் (உ.ஆ) - **கலித்தொகை**
   பாவைபிரிண்டர்ஸ்,
   சென்னை - 2007.

4. வ.த.இராமசுப்பிரமணியம் (உ.ஆ) - **அகநானூறு**
   திருமகள் நிலையம், சென்னை
   முதற் பதிப்பு 2009.

5. வ.த.இராமசுப்பிரமணியம் (உ.ஆ) - **புறநானூறு**
   திருமகள் நிலையம, சென்னை.
   முதற் பதிப்பு 2008.

6. முனைவர்.இரா.மோகன் (உ.ஆ) - **பத்துப்பாட்டு (பகுதி - 2)**
   நியூ செஞ்சுரி புக் ஹவுஸ்,
   சென்னை - 98,
   முதற் பதிப்பு - 2007.

7. எஸ். கௌமாரீஸ்வரி (பதி.ஆ) - **திருக்குறள் பரிமேலழகர் உரை**
   சாரதா பதிப்பகம், சென்னை - 600 014,
   முதற்பதிப்பு - 2002.

8. எஸ். கௌமாரீஸ்வரி (பதி.ஆ) - **பதினெண்கீழ்க்கணக்கு நூல்கள்**
   சாரதா பதிப்பகம், சென்னை - 14,
   முதற்பதிப்பு - மார்ச் - 2009.

ORGANIC AND PHYSICAL CHEMISTRY

Semester: IV **Hours: 6**

Code : 20CH4MC04 **Credits: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognise the concept of aromaticity and reactivity of aromatic compounds.	PSO - 2	U, Ap
CO - 2	Gain knowledge on aliphatic alcohols, phenols and ethers.	PSO - 1	U
CO - 3	Discuss the chemical aspects of dyes.	PSO - 3	U, Ap
CO - 4	Acquire knowledge on thermochermistry and liquid state.	PSO - 2	U, C
CO - 5	Recognize the importance of first law of thermodynamics.	PSO - 1	E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**ORGANIC AND PHYSICAL CHEMISTRY**							**Hours: 6**
Code : 20CH4MC04											**Credits: 6**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	4	4	3	3	4	4	3	4	4	3.72
CO - 2	4	4	4	4	3	3	4	4	3	3	4	3.64
CO - 3	4	4	4	4	3	3	3	4	3	4	4	3.82
CO - 4	4	4	4	4	3	3	4	4	4	3	4	3.55
CO - 5	4	4	4	4	3	3	3	3	3	3	4	3.45
Overall Mean Score												**3.63**

Result: The score for this course is **3.63** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

a) ARENES AND AROMATICITY:

Introduction - nomenclature of benzene derivatives - classification of aromatic aryl groups - aromatic nucleus and side chain - structure of benzene: resonance structure and molecular orbital structure - concept of aromaticity: aromatic, anti aromatic and non aromatic - Huckel's rule

b) ELECTROPHILIC AROMATIC SUBSTITUTION AND ADDITION REACTIONS:

General mechanism - role of σ and π complexes in aromatic electrophilic substitution: halogenations, nitration, sulphonation, Fridel-Crafts reaction and mercuration - unimolecular aromatic electrophilic substitution mechanism (ArS_E^1) - addition reactions: addition of hydrogen, Birch reduction, addition of halogens

c) ORIENTATION IN AROMATIC RING:

Rules of orientation - effect of substituents on reactivity - effect of substituents on reactivity and orientation - introduction of third group into the benzene ring

(18 Hours)

UNIT II

a) ALCOHOLS:

Introduction - classification - nomenclature - general methods of preparation: monohydric alcohols, dihydric alcohols and trihydric alcohols - chemical properties - distinction between primary, secondary and tertiary alcohols

b) PHENOLS:

Introduction - nomenclature - classification - isomerism - general methods of preparation of phenols - Dow's process - Raschig process - general physical and chemical properties - uses - comparison between alcohols and phenols

c) ETHERS:

Introduction - nomenclature - isomerism - general methods of preparation - general physical properties - Ziesel method of estimation of methoxy or ethoxy group **(18 Hours)**

UNIT III

DYES, COLOUR AND CHEMICAL CONSTITUTION:

Introduction - colour and chemical constitution - theories of colour and chemical constitution - requirements of a compound to act as a dye - chemical nature - classification - nomenclature - nitro and nitroso dyes: picric acid and martius yellow - azo dyes: aniline yellow, methyl red, methyl orange, Bismarck brown and cango red - phthalein dyes: phenolphthalein - xanthen dyes: fluorescein - triphenyl methane dyes: malachite green and crystal violet - anthraquinone dyes: alizarin - indigoid dyes: indigo **(18 Hours)**

UNIT IV

a) THERMOCHEMISTRY:

Definition - change of internal energy and enthalpy in a chemical reaction: enthalpy of combustion, formation, neutralization and precipitation - Hess's law of constant heat summation - applications - Kirchoff's equation - calculation of bond energy from thermo chemical data

b) THE LIQUID STATE:

Intermolecular forces - polar and non polar molecules - heteronuclear diatomic molecules - direction of dipole moment - percentage of ionic character - dipole moments of halogen acids - bond moments and dipole moments of polyatomic molecules - dipole moment and cis-trans isomerism - intermolecular interactions: Induced dipole-induced dipole interaction, dipole-induced dipole interaction, dipole-dipole interaction - similarity of various interactive energies - repulsive forces - hydrogen bonding: types and consequences - unusual behaviour of water and its effect - hydrophobic interactions - aromatic π-π interactions - interactions involving ions **(18 Hours)**

UNIT V

THERMODYNAMICS-I:

Introduction - importance of thermodynamics - terms in thermodynamics: system - surrounding - types of systems - macroscopic system: homogeneous and heterogeneous system, state of a system, state variables, independent and dependent variables - thermodynamic equilibrium - macroscopic properties - extensive and intensive properties - processes and their types: isothermal, adiabatic, isobaric, isochoric, cyclic process, reversible and irreversible process - nature of work and heat - First law: statement - internal energy - mathematical formulation - work of expansion - exact and inexact differentials: Euler reciprocal relation and cyclic rule - enthalpy of a system : enthalpy change during an isobaric process, enthalpy of vaporization and enthalpy of fusion - heat capacity: heat capacity at constant volume (C_v) and at constant pressure (C_p) - relationship between C_p and C_v - expansion of an ideal gas: isothermal expansion, workdone in isothermal reversible expansion and irreversible isothermal expansion - Joule-Thomson effect - Joule-Thomson coefficient - calculation of Joule-Thomson coefficient and the inversion temperature - zeroth law of thermodynamics - absolute temperature scale **(18 Hours)**

COURSE BOOKS:

1. M.K. Jain, S.C. Sharma and Fateh Bahadur, Graduate Organic Chemistry, Vishal Publishing Co., Volume - I edition, 2018, **Unit I**
2. M.K. Jain, S.C. Sharma and Jyotsna Chaturvedi, Graduate Organic Chemistry, Vishal Publishing Co., Volume - II, 2014, **Unit II**
3. M.K. Jain, S.C. Sharma and Jyotsna Chaturvedi, Graduate Organic Chemistry, Vishal Publishing Co., Volume - III, 2014, **Unit III**
4. B.R. Puri, L.R. Sharma, Madan S. Pathania and Dr. B.S. Lark, Graduate Physical chemistry, Vishal Publishing Co., Volume I 2017, **Unit IV**
5. B.R. Puri, L.R. Sharma, Madan S. Pathania and Dr. B.S. Lark, Graduate Physical chemistry, Vishal Publishing Co., Volume II, 2017, **Unit IV and V**

BOOKS FOR REFERENCE:

1. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4^{th} edition, 2014
2. K.S. Tewari and N.K. Vishnoi, A Text Book of Organic Chemistry, Vikas Publishing House Pvt. Ltd., 3^{rd} edition, 2011.
3. P.L. Soni and H.M. Chawla, Text book of Organic Chemistry, Sultan Chand and Sons, Reprint, 2014.
4. I.L. Finar, Organic Chemistry, Volume II, Dorling Kindersley, 5^{th} edition, 2008.
5. B.R. Puri, L.R. Sharma and Madan S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 47^{th} edition, 2016.

PRACTICAL: VOLUMETRIC ANALYSIS

Semester: IV **Hours: 3**

Code : 20CH4CP03 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain analytical skills in weighing of the standard substance by both chemical balance and electronic balance.	PSO - 2	U, An
CO - 2	Apply the skills to do the volumetric titration in double burette method.	PSO - 3	U, Ap
CO - 3	Estimate the amount of substance present in the given solution.	PSO - 2	U, E
CO - 4	Develop problem solving skills.	PSO - 3	U, Ap
CO - 5	Demonstrate the different types of titrations such as acidimetry, alkalimetry, permanganometry and iodometry.	PSO - 5	U, An, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**PRACTICAL: VOLUMETRIC ANALYSIS**							**Hours: 3**
Code : 20CH4CP03											**Credits: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	4	3	3	3	3	4	4	4	4	3.63
CO - 2	4	4	4	3	3	4	3	3	3	4	4	3.54
CO - 3	3	3	3	4	4	3	3	4	4	4	4	3.54
CO - 4	4	4	4	3	4	4	4	4	3	4	4	3.81
CO - 5	3	4	4	3	4	3	4	4	3	4	3	3.54
Overall Mean Score												**3.61**

Result: The score for this course is **3.61** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

DOUBLE TITRATION BY MICROSCALE METHOD:

Preparation of a standard solution - making up of the solution to be estimated - double burette method

I ACIDIMETRY AND ALKALIMETRY

1. Estimation of sodium hydroxide
2. Estimation of sodium carbonate
3. Estimation of hydrochloric acid
4. Estimation of oxalic acid

II PERMANGANIMETRY

1. Estimation of ferrous sulphate
2. Estimation of ferrous ammonium sulphate
3. Estimation of oxalic acid

III IODOMETRY

1. Estimation of potassium dichromate
2. Estimation of copper sulphate

IV DICHROMETRY (ONLY CLASS WORK)

Estimation of ferrous sulphate using external indicator

BOOK FOR REFERENCE:

Practical manual prepared by the Department of Chemistry, Reprint, 2020

ALLIED PHYSICS THEORY - II

ELECTRICITY AND ELECTRONICS

Semester: IV **Hours: 3**

Code : 20PH4AC02 **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	Describe the laws of electrostatics.	PSO - 1	K, U
CO-2	Apply the laws of electricity to a.c bridges for the electrical measurements.	PSO - 1, 3	U, Ap
CO-3	Explain magnetic effects of alternating currents.	PSO - 1	U
CO-4	Explain the basic concepts of electronic components.	PSO - 1	K, U
CO-5	Distinguish various number systems and design logic circuits using gates.	PSO - 2, 3	Ap, An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV			ALLIED PHYSICS THEORY - II						Hours: 3			
Code : 20PH4AC02			ELECTRICITY AND ELECTRONICS						Credits: 3			
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO-1	5	5	4	2	2	2	5	4	4	3	2	3.45
CO-2	4	5	4	2	2	2	5	4	5	4	2	3.55
CO-3	5	4	3	2	2	2	5	4	4	3	2	3.27
CO-4	5	5	5	3	2	2	5	4	3	4	2	3.64
CO-5	5	4	5	2	2	2	4	5	5	3	2	3.55
Overall Mean Score												**3.49**

Result: The score for this course is **3.49** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I: ELECTROSTATICS

Coulomb's Law - Electric field - Electric field due to point charge - Gauss Law- Applications of Gauss Law - Electric field due to an infinite plane sheet of charge- Field near a charged conducting cylinder - Coulomb's Theorem (Field of charged Conductor - Potential Difference - Potential at a point due to a point charge Relation between electric field and electric potential - Capacitor - Capacitance of parallel plate capacitor - Partly filled with dielectric slab - Capacitance of the spherical capacitor (outer sphere earthed) - capacitance of the cylindrical capacitor- Energy stored in a charged capacitor-Loss of energy on sharing of charges between two capacitor. **(9 Hours)**

UNIT II: CURRENT ELECTRICITY

Kirchhoff's laws- Application of Kirchhoff law to Wheatstone's network - Sensitivity of Wheatstone bridge - Wheatstone's network- Determination of the temperature of resistance-Potentiometer- Calibration of ammeter-Calibration of voltmeter (Low range, High range) - Measurement of resistance using potentiometer.

(9 Hours)

UNIT III: MAGNETIC EFFECT OF ELECTRIC CURRENT

Force on a current-carrying conductor in a magnetic field - Torque on a current in a uniform magnetic field - The D' Arsonval moving coil galvanometer (Mirror galvanometer) - Current and voltage sensitivity of a moving coil galvanometer - Moving coil ballistic galvanometer - Measurement of charge sensitivity- Difference between Dead-Bead and ballistic galvanometer - Comparison of emf of two cells using BG - Comparison of two capacitors using BG

ALTERNATING CURRENT:

EMF generated in a coil rotating in a uniform magnetic field - Mean value of AC- Root mean square value of an AC - Review of subjects - AC circuits containing resistance, Inductance and Capacitance in series (series resonance circuit) - Parallel Resonance Circuit - Comparison between series and parallel resonant circuit - Wattless current - Choke coil. **(9 Hours)**

UNIT IV: ELECTRONICS

Formation of PN junction diode - Forward and reverse biasing of a junction diode - V - I Characteristic of junction diode - Zener Diode - Experiment to study the characteristic to the Zener diode - Light emitting diode - Bridge Rectifier - Filter circuits-π-section Filter - Transistor - Working of an NPN Transistor - Common emitter configuration - Characteristics of transistor (CE mode) - Transistor biasing - CE transistor amplifier - Hartley Oscillator - Modulations - Operational amplifier - Characteristic of an OP-AMP - The common mode rejection ratio - Slew Rate - Virtual Earth - Inverting Amplifier - Non inverting amplifier - Adder or summing amplifier - Difference amplifier or subtractor.

(9 Hours)

UNIT V: NUMBER SYSTEM AND CODES

Decimal number system - Binary number system - Conversion of binary number into decimal number - Conversion of decimal number into binary number - Binary Addition, Subtraction.

LOGIC CIRCUITS

Boolean algebra - Digital logic gates - NOT Gate (Inverter) - OR Gate - AND Gate, NOR Gate - NOR gate is a universal gate - NAND gate is a universal gate - NOT Gate exclusive OR Gate. **(9 Hours)**

BOOK FOR STUDY:

- R. Murugeshan - Electricity & Electronics - 2016.

DETAILED REFERENCE:

- R. Murugeshan - Electricity & Electronics - 2016.

  UNIT I : Chapter-1 All sections

  UNIT II : Chapter-2 All sections

  UNIT III : Chapter-3 All sections

  UNIT IV : Chapter-4 All sections

  UNIT V : Chapter-5 All sections

ALLIED PHYSICS PRACTICAL - II

Semester: IV **Hours: 2**

Code : 20PH4AP02 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	Construct logic circuits using discrete components and IC's	PSO - 3	Ap
CO-2	Verify Boolean laws	PSO - 3	Ap
CO-3	Construct adder and subtractor circuits using IC's	PSO - 3	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**ALLIED PHYSICS PRACTICAL - II**							**Hours: 2**
Code : 20PH4AP02											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO-1	4	5	5	2	2	2	4	4	5	3	2	3.45
CO-2	4	5	5	2	2	2	4	4	5	3	2	3.45
CO-3	4	5	5	2	2	2	4	4	5	3	2	3.45
Overall Mean Score												**3.45**

Result: The score for this course is **3.45** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

LIST OF PRACTICALS (Any Six)

1. Construction of AND, OR, NOT - Using discrete components.
2. Construction of AND, OR, NOT - Using IC 74 Series.
3. Construction of NAND, NOR - Using IC.
4. Determination of frequency of the AC mains using Sonometer.
5. Construction of AND, OR, NOT gates using universal Gates.
6. To study the frequency response of LCR Series Circuit.
7. To study the characteristics of Zener Diode
8. Verification of Boolean theorems.
9. Construction and verification of Half adder and Half Subtractor.

HETEROCYCLIC CHEMISTRY

Semester: IV **Hours: 4**

Code : 20CH4DE2A **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Classify the heterocyclic compounds.	PSO - 2	K, C
CO - 2	Realize the chemistry of three and four membered ring compounds.	PSO - 2	Ap
CO - 3	Gain knowledge on synthesis and chemical reactions of pyrrole, furan and thiazole.	PSO - 4	K, An
CO - 4	Recall the chemical aspects of five membered ring with two hetero atoms and pyridine.	PSO - 2, PSO - 4	C
CO - 5	Summarize the synthesis and properties of condensed heterocyclic system.	PSO - 3	K

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**HETEROCYCLIC CHEMISTRY**							**Hours: 4**
Code : 20CH4DE2A											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	4	3	4	5	3	4	4	3	4	4	3.72
CO - 2	4	4	4	4	3	3	3	4	3	3	3	3.45
CO - 3	4	4	4	4	3	3	4	4	3	3	4	3.45
CO - 4	4	4	4	4	3	3	3	4	3	4	4	3.63
CO - 5	4	4	4	4	3	3	3	4	4	3	3	3.54
Overall Mean Score												**3.59**

Result: The score for this course is **3.59** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

HETEROCYCLIC CHEMISTRY:

Introduction - classification : Three membered heterocyclic compounds, four membered heterocyclic compounds, five membered heterocyclic compounds, six membered heterocyclic compounds and condensed heterocyclic compounds - nomenclature-molecular orbital picture and aromatic character of pyrrole, furan, thiophene and pyridine **(12 Hours)**

UNIT II

THREE AND FOUR MEMBERED HETEROCYCLES:

Three-membered heterocycles with one heteroatom - oxiranes (epoxides): synthesis from ethylene-ring opening - aziridines: synthesis from styrene- Friedal-Crafts reaction - thiiranes: synthesis by treatment of oxiranes with phosphine sulphide - four membered heterocycles - azetidines: synthesis from 3-chloropropyl bromide-oxetanes:synthesis by Paterno-Buchi reaction-ring opening - thietanes: synthesis from 1,3-dibromopropane-action of heat **(12 Hours)**

UNIT III

FIVE MEMBERED HETEROCYCLES (ONE HETERO ATOM):

Five membered heterocycles containing single heteroatom - general synthesis (Paal-Knorr synthesis) - synthesis of pyrrole, furan and thiophene - chemical properties - electrophilic substitution reactions-addition reactions - acidic character - oxidation - structure of pyrrole - orbital structure of pyrrole and aromatic character - structures of furan and thiophene - comparison of basic character - furfural (synthesis) **(12 Hours)**

UNIT IV

FIVE (TWO HETERO ATOM) AND SIX MEMBERED HETEROCYCLES:

Five membered heterocycles containing two heteroatoms: structure of pyrazole, imidazole, oxazole, isooxazole, thiazole and isothiazole - benzimidazole, benzoxazole, benzothiazole and benzopyrazole - six membered heterocycles - pyridine - isolation from coal tar-Haworth synthesis of pyridine - structure - chemical properties - basic character - reduction-electrophilic substitution reactions - nucleophilic substitution reactions: amination (Chichibabin reaction) - structure elucidation of pyridine - comparative study of basicity of pyridine, piperidine and pyrrole **(12 Hours)**

UNIT V

CONDENSED HETEROCYCLES:

Condensed five and six-membered heterocycles - structure of indole-quinoline: occurrence, Skraup synthesis, Friedlander's synthesis - properties: basic character, reduction, oxidation and electrophilic substitution - isoquinoline: basic character, oxidation, reduction and electrophilic substitution - structure elucidation of quinoline and isoquinoline **(12 Hours)**

COURSE BOOKS:

1. M.K. Jain, S.C. Sharma and Jyotsna Chaturvedi, Graduate Organic Chemistry, Vishal Publishing Co., Volume-III, 2018-19, **Unit I, III-V**
2. V.K. Ahluwalia, Heterocyclic Chemistry, Narosa Publishing House, Revised edition, 2016, **Unit I-II**

BOOKS FOR REFERENCE:

1. P.L. Soni and H.M. Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2007
2. K.S. Tewari, N.K. Vishnoi, A text book of Organic Chemistry, Vikas Publishing House Pvt. Ltd., 3rd edition, 2006
3. Arun Bahl, B.S. Bahl, Advanced Organic Chemistry, S. Chand and Company Ltd., 1st edition, 2006
4. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th edition, 2014

FUEL CHEMISTRY

Semester: IV **Hours: 4**

Code : 20CH4DE2B **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Discuss the various energy sources and their applications.	PSO - 1	K, U
CO - 2	Classify the various types of fuels.	PSO - 2	U, C
CO - 3	Recognise the applications of fuels.	PSO - 1	U, Ap
CO - 4	Gain knowledge on chemistry of biofuels.	PSO - 1	K, U, Ap
CO - 5	Discuss the applications of fuels.	PSO - 3	U, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**FUEL CHEMISTRY**							**Hours: 4**
Code : 20CH4DE2B											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	4	4	3	2	3	4	2	4	3	3.36
CO - 2	4	4	4	4	3	2	3	4	2	3	3	3.27
CO - 3	4	3	4	3	4	2	3	4	2	3	3	3.18
CO - 4	4	3	4	4	3	2	4	4	3	3	2	3.27
CO - 5	4	4	4	4	3	3	4	4	3	3	2	3.45
Overall Mean Score												**3.31**

Result: The score for this course is **3.31** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

ENERGY SOURCES:

Renewable energy sources: solar, wind and geothermal energy - bioenergy- hydropower and ocean energy - non-renewable energy sources: fossil fuels and nuclear fuels - definition and examples - fuel - definition - calorific value - determination of calorific value - classification of fuels: primary and secondary - criterion for selection of fuel - properties: ignition temperature - flame temperature - flash point - fire point **(12 Hours)**

UNIT II

SOLID FUELS:

Natural - artificial - industrial solid fuels - Coal: formation - properties - classification - coking - non coking and pulverisation of coal - role of sulphur and ash in coal - analysis of coal: proximate and ultimate - advantages and disadvantages of solid fuels - fractional distillation of coal tar - uses of coal tar based chemicals **(12 Hours)**

UNIT III

LIQUID FUELS:

Petroleum and petrochemicals - refining of petroleum - composition and uses of main petroleum fractions - cracking - thermal - catalytic cracking - advantages - octane rating - anti knock agents - unleaded petrol - cetane rating - antidiesel knock agents - hydrocarbons from petroleum - petrochemicals - direct and indirect petrochemicals - catalysts used in petroleum industry **(12 Hours)**

UNIT IV

GASEOUS FUELS:

Classification : natural - artificial gaseous fuels - examples and their importance - water gas- producer gas - semi water gas - LPG - manufacture - composition and uses - gobar gas - biogas generation-advantages and disadvantages

(12 Hours)

UNIT V

BIO FUELS:

Definition - sources and classification: biodiesel - bioethanol - hydrogen fuel from biomass - uses manufacture of biodiesel - advantages of biofuels **(12 Hours)**

BOOKS FOR REFERENCE

1. B.K. Sharma, Industrial Chemistry, Goel Publishing House, 13th Edition, 2002, **Unit I-IV**

2. P.C. Jain & Jain, Engineering Chemistry, Dhanpat Rai Publishing Company (P) LTD, 16th Edition, 2015, **Unit I-IV**

WEB RESOURCES

1. https://en.m.wikipedia. Org/wiki/Biofuels **(Unit V)**
2. https://www.studentenergy.org/topics/biofuels **(Unit V)**

SUPRAMOLECULAR CHEMISTRY

Semester: IV **Hours: 4**

Code : 20CH4DE2C **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain knowledge on the structural and functional basics of building blocks in supramolecular chemistry	PSO - 2	K, An
CO - 2	Know the selectivity in supramolecular formation and various factors affecting it	PSO - 4	U, Ap
CO - 3	Acquire knowledge on host - guest chemistry	PSO - 5	Ap, An, S
CO - 4	Know the various types of bindings in supramolecules	PSO - 3	U, Ap, E
CO - 5	Evaluate about solid state supramolecular chemistry	PSO - 5	Ap, An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV			**SUPRAMOLECULAR CHEMISTRY**						**Hours: 4**		
Code : 20CH4DE2C											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	4	3	3	3	3	4	4	4	4	3.72
CO - 2	4	4	4	3	3	4	3	3	3	4	4	3.54
CO - 3	3	4	3	4	4	3	3	4	4	4	4	3.63
CO - 4	4	4	4	3	4	4	4	4	3	4	4	3.81
CO - 5	3	4	4	3	4	3	4	4	3	4	3	3.54
Overall Mean Score												**3.65**

Result: The score for this course is **3.65** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I: INTRODUCTION TO SUPRAMOLECULAR CHEMISTRY:

Introduction - selectivity - the lock and key principle and induced-fit model - complementarity - co-operativity and the chelate effect - preorganisation - binding constants - kinetic and thermodynamic selectivity. **(12 Hours)**

UNIT II: SUPRAMOLECULAR INTERACTIONS:

Supramolecular interactions: ionic and dipolar interactions - hydrogen bonding - π-interactions - van der waals interactions - hydrophobic effects - supramolecular design **(12 Hours)**

UNIT III

a) HOST - GUEST CHEMISTRY:

Introduction - guests in solution - macrocyclic versus acyclic hosts - high dilution synthesis - template synthesis

b) CATION BINDING:

Introduction, crown ethers, lariat ethers and cryptands - spherands - hemispherands - cryptaspherands - heterocrowns - heterocryptands - calixarenes **(12 Hours)**

UNIT IV: CATION, ANION AND NEUTRAL BINDINGS:

Anion binding: charged receptaors, electrostatic interactions, electrostatic, hydrogen binding interactions, neutral receptors, Lewis-acid receptors and anticrowns - metal containing receptors - simultaneous cation and anion receptors - neutral binding. **(12 Hours)**

UNIT V: SOLID STATE SUPRAMOLECULAR CHEMISTRY:

Introduction - zeolites: structure, composition, zeolites and catalysis - clathrates - urea/thiourea clathrates - trimesic acid clathrates - hydroquinone and Dianin's compound - coordination polymers: metal organic frameworks and properties of coordination polymers. **(12 Hours)**

COURSE BOOK:

- Jonathan W. Steed, David R. Turner and Karl J. Wallace, Core Concepts in Supramolecular Chemistry and Nanochemistry, Johny Wiley & Sons, Ltd., 2007, **Unit - I to V**

ORGANIC CHEMISTRY -I

Semester: V **Hours: 6**

Code : 20CH5MC05 **Credits: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on the reactions and their mechanisms of carbonyl compounds.	PSO - 2, PSO - 5	K, Ap
CO - 2	Recognize the reactivity of organic compounds having carboxylic acid group.	PSO - 2, PSO - 3	C, An
CO - 3	Explain the synthetic importance of acetoacetic and malonic esters.	PSO - 2, PSO - 5	K, Ap
CO - 4	Evaluate the importance of carbohydrates.	PSO - 2	K, C
CO - 5	Discuss properties of terpenoids and poly nuclear hydrocarbon.	PSO - 1, PSO - 3	K, U, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**ORGANIC CHEMISTRY -I**							**Hours: 6**
Code : 20CH5MC05											**Credits: 6**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	4	3	3	4	5	4	3	4	3.82
CO - 2	4	3	4	3	5	3	4	4	4	3	4	3.72
CO - 3	4	4	3	3	4	4	3	4	4	3	4	3.63
CO - 4	4	3	4	3	4	4	4	4	4	3	4	3.72
CO - 5	4	4	3	3	4	4	4	3	4	3	4	3.63
Overall Mean Score												**3.704**

Result: The score for this course is **3.7** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I

ALDEHYDES AND KETONES:

Introduction - nomenclature - general methods of preparation: Rosenmund's reduction - Stephen's method - from carboxylic acids - Gattermann aldehyde synthesis - Houben-Hoesch synthesis - structure and reactivity of carbonyl group - relative reactivities of aldehydes and ketones in nucleophilic additions - nucleophilic addition reactions and their mechanism: addition of Grignard reagent, HCN, sodium bisulphite, water and alcohols - condensation reactions: Aldol - cross Aldol - Claisen Schmidt - Claisen - Perkin - Benzoin - Knoevenagel - Stobbe - comparative properties of aldehydes and ketones - α, β-unsaturated aldehydes and ketones: preparation - chemical properties - electrophilic additions across the carbon - carbon double bond - nucleophilic addition to carbonyl group - Michael, Diels-Alder and Tischenko reactions (**18 Hours**)

UNIT II

a) SATURATED CARBOXYLIC ACIDS:

Introduction - nomenclature - structure and bonding - isomerism - general methods of preparation: by oxidation - hydrolysis of cyanides - carbonation of organometallic reagents - Arndt-Eistert synthesis - haloform reaction - structure of the carboxylic acids and carboxylate anions - chemical properties: acidic character and acid constants (K_a and pK_a) - comparison of acidity of phenol and aromatic carboxylic acids - conversion into carboxylic acid derivatives - synthesis of acid chlorides, esters and anhydrides - reduction to alcohols - decarboxylation - Kolbe's electrolysis - Curtius - Schmidt - hydroxy acids: preparation, properties and uses of lactic acid, tartaric acid malic acid and salicylic acid - dicarboxylic acid: nomenclature - general methods of preparation - action of heat on dicarboxylic acids

b) UNSATURATED CARBOXYLIC ACIDS:

α, β-unsaturated monocarboxylic acid: preparation and properties - α, β-unsaturated dicarboxylic acids: maleic acid - fumaric acid **(18 Hours)**

UNIT III

SYNTHETIC APPLICATIONS:

a) ACTIVE METHYLENE COMPOUNDS:

Active methylene group - preparation and synthetic uses of acetoacetic ester, malonic ester, diazo methane, diazoacetic ester and cyanoacetic ester

b) ORGANOMETALLIC COMPOUNDS:

Grignard reagents - preparation - structure - chemical reactions and synthetic applications - nucleophilic addition reactions followed by hydrolysis - nucleophilic substitution reactions - preparation, properties and applications of organolithium compounds and organozinc compounds **(18 Hours)**

UNIT IV

CARBOHYDRATES:

Definition - classification - reducing and non-reducing sugars - configuration of aldotriose and aldopentose - monosaccharides: manufacture of glucose from starch - constitution and chemical properties of glucose and fructose - Kiliani-Fischer synthesis (ascending the series of aldoses) - Wohl degradation (descending the series of aldoses) - epimerisation of an aldohexose - conversion of an aldohexose into a ketohexose - conversation ketohexose into aldohexoses - glycosides - disaccharides: constitution of sucrose and maltose - inversion of sucrose - uses - polysaccharides: starch and cellulose - industrial uses of cellulose - analysis of carbohydrate **(18 Hours)**

UNIT V

TERPENOIDS:

Introduction - isoprene rule - classification - isolation of terpenoids - monoterpenoids - constitution of myrcene - citral - geraniol - cyclic terpenoids: preparation, properties and uses of menthol - bicyclic monoterpenoids: preparation, properties and uses of α-pinene and camphor - polyterpenes: structure of natural rubber

POLYNUCLEAR HYDROCARBONS AND THEIR DERIVATIVES:

Naphthalene - isolation - from coal tar and petroleum - synthesis of naphthalene (Haworth synthesis) - chemical properties - preparation, properties and uses of naphthols and naphthylamines - distinction between α, β-derivatives - synthesis of anthracene - Friedel-Crafts - Haworth - Diels Alder reaction (**18 Hours**)

COURSE BOOKS:

1. M.K. Jain, S. C. Sharma and Jyotsna Chaturvedi, Graduate Organic Chemistry, Volume II, Vishal Publishing Co., 3rd edition, 2019, **Unit I-III**
2. M.K. Jain, S.C.Sharma and Jyotsna Chaturvedi, Graduate Organic Chemistry, Volume III, Vishal Publishing Co., 3rd edition, 2019, **Unit III and IV**
3. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th edition 2014, **Unit V**
4. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th edition, 2007, **Unit V**

BOOK FOR REFERENCE:

1. K.S. Tewari, N.K. Vishnoi, a course books of Organic Chemistry, Vikas Publishing House Pvt. Ltd., 3rd edition, 2006

PHYSICAL CHEMISTRY - I

Semester: V **Hours: 6**

Code : 20CH5MC06 **Credits: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognize the importance of II and III laws of thermodynamics.	PSO - 3	E
CO - 2	Discuss about chemical equilibrium and distribution law.	PSO - 2	U, C
CO - 3	Analyze the importance of phase rule and liquid crystals.	PSO - 4	K, An
CO - 4	Acquire knowledge on solutions.	PSO - 4	U, An
CO - 5	Formulate solutions and their properties.	PSO - 2	An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**PHYSICAL CHEMISTRY -I**							**Hours: 6**
Code : 20CH5MC06											**Credits: 6**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	4	4	3	4	3	3	2	3	4	3.18
CO - 2	4	4	4	4	3	3	4	3	4	3	3	3.45
CO - 3	4	4	4	4	2	4	3	3	4	4	4	3.55
CO - 4	4	4	4	4	3	4	3	3	3	3	4	3.45
CO - 5	4	4	4	4	3	3	3	4	4	3	3	3.54
Overall Mean Score												**3.43**

Result: The score for this course is **3.43** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

a) THERMODYNAMICS II:

Limitations of the first law - need for the second law - statements of second law of thermodynamics - spontaneous and reversible processes - cyclic process - Carnot's cycle - combined form of first and second law of thermodynamics - concept of entropy - entropy change accompanying change of phase - calculation of entropy change of an ideal gas - entropy changes of an ideal gas in different process - entropy of a mixture of an ideal gases - physical significance of entropy

b) THERMODYNAMICS III:

Introduction - Nernst heat theorem - third law of thermodynamics - exception - determination of absolute entropies of solids, liquids and gases - experimental verification - entropy changes in chemical reaction - residual entropy - criteria for reversible and irreversible processes - Gibbs Helmholtz equation **(18 Hours)**

UNIT II

a) CHEMICAL EQUILIBRIUM:

Equilibrium - law of mass action - free energy and chemical equilibrium - thermodynamic derivation of the law of mass action - van't Hoff reaction isotherm - distinction between ΔG and ΔG^{o} - relation between K_p, K_c and K_x - homogeneous and heterogeneous equilibria - temperature dependence of the equilibrium constant (van't Hoff isochore) - Le-Chatlier principle and application - Clapeyron-Clausius eqation - application

b) DISTRIBUTION LAW:

Definition - conditions for the validity of the distribution law - thermodynamic derivation - verification - modification - applications **(18 Hours)**

UNIT III

a) PHASE EQUILIBRIUM:

Introduction - terms - systems with various phases - derivation of Gibbs phase rule - phase diagrams - application of phase rule to one component system: water system, polymorphism and sulphur system - application of phase rule to two component systems: eutectic mixtures - Pb-Ag system and KI-H_2O system - uses of eutectic mixtures - freezing mixtures - formation of compounds with congruent melting points: $FeCl_3$-H_2O system, formation of compounds with incongruent melting points: Na_2SO_4-H_2O system - $CuSO_4$-H_2O system - solid gas equilibria: deliquescence and efflorescence

b) LIQUID CRYSTALS:

Liquid crystals (mesomorphic state) - types of mesomorphism - classification of thermotropic liquid crystals: smectic and nematic liquid crystals - compounds exhibiting both smectic and nematic characters - difference between solids, liquids and liquid crystals - applications of liquid crystals **(18 Hours)**

UNIT IV

SOLUTIONS-I:

Introduction - types of solutions - methods expressing concentrations and conversion: mass, volume percent, strength, molarity, molality, normality, mole fraction and mole percent - ideal and non-ideal solutions - Raoult's law - partial molar properties - chemical potential and its significance - Gibbs - Duhem equation - variation of chemical potential with temperature and pressure - change in chemical potential of an ideal gas - chemical potential of a component gas in a mixture of ideal gases - chemical potential of a non-ideal gas - fugacity at low pressure and fugacity coefficient - fugacity of a gas in a gaseous mixture - activity of a component in an ideal solution - fractional distillation of binary liquid systems - azeotropic mixture - steam distillation - solubility of partially miscible liquids - phenol water system - effect of impurities on critical solution temperature - solutions of gases in liquids - factors influencing solubility of a gas - Henry's law - applications of Henry's law **(18 Hours)**

UNIT V

SOLUTIONS-II:

Colligative properties - lowering of vapour pressure by a non-volatile solute - derivation of relative lowering of vapour pressure - osmosis and osmotic pressure - determination of molar mass from osmotic pressure - relation between vapour pressure lowering and osmotic pressure - reverse osmosis - elevation of boiling point - derivation of molal elevation constant (K_b) - determination of molar mass from boiling point elevation - depression of freezing point - derivation of molal depression constant (K_f) - determination of molar mass from freezing point depression - determination of freezing point depression: the Rast method **(18 Hours)**

COURSE BOOKS:

1. B.R. Puri, L.R. Sharma, Madan S. Pathania and Dr. B.S.Lark, Graduate Physical Chemistry, Vishal Publishing Co., Volume- I, **Unit I and III**
2. B.R. Puri, L.R. Sharma, Madan S. Pathania and Dr. B.S.Lark, Graduate Physical Chemistry, Vishal Publishing Co., Volume- II, 2017, **Unit II and III**
3. B.R. Puri, L.R. Sharma, Madan S. Pathania and Dr. Navjot Kaur, Graduate Physical Chemistry, Vishal Publishing Co., Volume - III, 2017, **Unit IV and V**

BOOKS FOR REFERENCE:

1. B.R. Puri, L.R. Sharma and Madan S. Pathania, Principles of Physical Chemistry, Vishal publishing Co., 47th edition, 2016, New Delhi.
2. Arun Bahl, B.S. Bahl and G.D. Tuli, Essentials of Physical Chemistry, S. Chand and Company Pvt. Ltd., Reprint 2014.

INORGANIC CHEMISTRY - I

Semester: V **Hours: 5**

Code : 20CH5MC07 **Credits: 5**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Discuss the important characteristics of non aqueous solvents, acids and bases.	PSO - 1	K, C
CO - 2	Discuss the important compounds of transition series and apply the methods to prepare transition metal complexes	PSO - 1	Ap, An
CO - 3	Explain the concept of chemistry of lanthanoids and actinoids.	PSO - 1, PSO - 4	K, An
CO - 4	Describe the various aspects of coordination chemistry	PSO - 1, PSO - 2	C,U
CO - 5	Acquire knowledge of coordination compound and Predict the structure of simple inorganic compounds	PSO - 1, PSO - 5	Ap, An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**INORGANIC CHEMISTRY -I**							**Hours: 5**
Code : 20CH5MC07											**Credits: 5**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	1	4	3	4	5	6	1	2	3	4	5	3.45
CO - 2	4	3	4	4	3	2	4	4	2	3	3	3.27
CO - 3	4	4	4	4	2	2	4	4	3	3	4	3.45
CO - 4	4	4	3	4	2	2	3	4	2	4	4	3.27
CO - 5	4	4	4	4	3	2	3	4	4	3	3	3.45
Overall Mean Score												**3.37**

Result: The score for this course is **3.37** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

a) NON AQUEOUS SOLVENTS:

Solvent - classification of solvents - properties of solvents - liquid ammonia - chemical reactions in liquid ammonia - solutions of alkali metals in liquid ammonia - advantages and limitations of liquid ammonia - liquid sulphur dioxide - reactions in liquid sulfur dioxide

b) ACIDS AND BASES:

Arrhenius concept - proton transfer theory - concept of Lowry and Bronsted - Lux - Flood concept - the solvent system concept - Lewis concept - relative strength of acids and bases- HSAB principle- applications of HSAB **(15 Hours)**

UNIT II

THE 'd' BLOCK ELEMENTS:

Introduction - important characteristic of d block elements - the elements of the first transition series: preparation, properties and uses of titanium dioxide, titanium(IV)chloride, vanadium pentoxide, potassium dichromate, potassium permanganate, potassium ferrocyanide, potassium ferricyanide, sodium nitroprusside, green vitriol, blue vitriol, verdigris and white vitriol - comparision of the properties of elements of first transition series with second and third transition series **(15 Hours)**

UNIT III

THE 'f' BLOCK ELEMENTS:

Lanthanoids : Definition - electronic configurations - stable oxidation states - ionic radii consequences and causes of contractions - differences between 4f and 5f orbitals - colour - magnetic properties of complexes - extraction - separation of lanthanoids

Actinoids: genral features of actinoids - separation of actinoids - comparison of inner transition and transition metals - comparison of actinoids with lanthanoids - oxides of thorium and uranium: preparation, properties and uses **(15 Hours)**

UNIT IV

COORDINATION CHEMISTRY I:

Double salts and coordination compounds - definitions and terminology - types of ligands - Werner's coordination theory - experimental verification - Werner's theory and isomerism - nomenclature of coordination compounds - Sidgwick's electronic concept - limitations - Effective Atomic Number (EAN) - factors affecting the stability of complex ion - nature of the ligand - chelating ligands and chelates - stereochemistry of coordination compounds with different coordination numbers - structural isomerism: ionization, hydrate, coordination and linkage isomerisms - stereo isomerism: geometrical and optical isomerism in complexes of coordination number 4 and 6 **(15 Hours)**

UNIT V

COORDINATION CHEMISTRY II:

Valence Bond Theory (VBT) - octahedral: inner and outer orbital complexes, square planar and tetrahedral complexes - shortcomings of VB theory - Crystal Field Theory (CFT) - crystal field splitting in tetragonal, square planar, tetrahedral and octahedral complexes - factors influencing the magnitude of crystal field splitting: nature of the central cation and nature of the ligand - comparison between VBT and CFT - magnetic properties of metal complexes and crystal field theory **(15 Hours)**

COURSE BOOKS:

1. B.R. Puri, L.R. Sharma and K.C. Kalia, Geetanjli Kaushal, Graduate Inorganic Chemistry, Vol- II, Vishal Publishing Co., **Unit I and III**
2. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Milestone Publishers and Distributor, Delhi, 32nd edition, 2015, **Unit I-V**

BOOKS FOR REFERENCE:

1. P. L. Soni and Mohan Katyal, Textbook of Inorganic Chemistry, Sultan Chand and Sons Educational Publishers, Reprint, 2014.
2. R.D. Madan, Modern Inorganic Chemistry, S. Chand and Company Ltd., 2nd edition, 2002.

PRACTICAL: PHYSICAL CHEMISTRY

Semester: V **Hours: 5**

Code : 20CH5CP04 **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Develop knowledge on conductometric titrations and potentiometric titrations.	PSO - 2	K, U
CO - 2	Determine critical solution temperature and molecular weight by Rast method.	PSO - 2	K, U
CO - 3	Determine rate constant of ester hydrolysis.	PSO - 3	U, Ap, An
CO - 4	Analyse and interpret the graphical representations.	PSO - 2	K, Ap
CO - 5	Develop problem solving skills.	PSO - 2	An, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V			**PRACTICAL: PHYSICAL CHEMISTRY**						**Hours: 5**		
Code : 20CH5CP04											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	3	4	4	3	4	4	4	4	3	3.72
CO - 2	4	4	4	4	4	3	4	4	4	3	4	3.81
CO - 3	4	4	4	4	4	3	4	4	4	3	4	3.81
CO - 4	4	4	4	4	4	3	4	4	4	3	4	3.81
CO - 5	4	4	4	4	4	3	4	4	4	3	4	3.81
	Overall Mean Score											**3.79**

Result: The score for this course is **3.79** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

LIST OF PRACTICALS:

1. Determination of Molecular Weight by Rast's method
2. Phase diagram: Simple eutectic
3. Critical Solution Temperature (CST) of phenol water system and effect of impurity (NaCl) on CST
4. Surface Chemistry: Adsorption Characteristics of Acetic Acid on Charcoal.
5. Kinetics: Determination of relative strength of acids by acid catalyzed hydrolysis of ester
6. Electrochemistry:
    i) Conductometric titration between a strong acid and a strong base
    ii) Potentiometric titration between ferrous sulphate and potassium dichromate

COURSE BOOK:

Practical manual prepared by the Department of Chemistry, Reprint, 2020

BOOK FOR REFERENCE:

V. Venkateswaran, R. Veeraswamy and A. R. Kulandaivelu, Basic principles of Practical Chemistry, Sultan Chand and Sons, 2nd edition, 1997.

ANALYTICAL CHEMISTRY

Semester: V **Hours: 4**
Code : 20CH5DE3A **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognise the principles and various precipitation techniques.	PSO - 1	An, E
CO - 2	Acquire knowledge on error analysis.	PSO - 3	K, C
CO - 3	Understand the various thermo and electro analytical techniques.	PSO - 4	E, S
CO - 4	Examine the significance and applications of various instrumental methods of analysis.	PSO - 2	K, E
CO - 5	Analyse and interpret the various chromatographic techniques.	PSO - 4	K, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V			**ANALYTICAL CHEMISTRY**								**Hours: 4**	
Code : 20CH5DE3A											**Credits: 3**	
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	3	5	3	3	3	4	4	4	4	4	3.63
CO - 2	4	3	4	3	3	3	4	4	4	3	4	3.54
CO - 3	5	3	4	3	3	3	4	4	4	3	4	3.63
CO - 4	5	3	4	3	3	3	4	4	5	4	4	3.81
CO - 5	4	3	4	3	4	4	4	4	4	3	4	3.72
	Overall Mean Score											**3.66**

Result: The score for this course is **3.66** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I

PRINCIPLES OF GRAVIMETRIC ANALYSIS:

Introduction to gravimetric analysis - precipitation methods - conditions for precipitation - supersaturation and precipitate formation - the purity of the precipitate: co-precipitation - post precipitation - solubility product and precipitation - precipitation from homogeneous solution - washing of the precipitate - organic precipitants: dimethylglyoxime, cupferron, oxine and cupron **(12 Hours)**

UNIT II

ERROR ANALYSIS:

Classification of errors - determinate errors (systematic errors) and indeterminate (random and accidental) - minimization of errors: calibration of apparatus, analysis of standard samples, running a blank determination and independent analysis - absolute and relative error - types of errors - correction of determinate errors and indeterminate errors - precision and accuracy: definition and difference - calculation of mean - median and standard deviation - F-test, t- test and Q-test - confidence limit - method of least squares - significant figures - rounding off the values **(12 Hours)**

UNIT III

a) THERMO ANALYTICAL METHODS:

Thermogravimetric analysis (TGA): principle - thermal analysis - derivative thermo gravimetry (DTG) - factors affecting thermogram - TGA instrument - applications of thermo gravimetry - differential thermal analysis (DTA), DTA instrument- DTA of calcium oxalate monohydrate

b) ELECTRO ANALYTICAL METHODS:

Electrogravimetry - electrolytic separation of metals - polarography - principles and applications - amperometric titrations - principles and applications

(12 Hours)

UNIT IV

INSTRUMENTAL METHODS OF ANALYSIS:

Principle, instrumentation and applications of fluorimetry - nephelometry - flame photometry - atomic absorption spectrophotometry - photocatalytic reactor and photoelectric colorimeter **(12 Hours)**

UNIT V

CHROMATOGRAPHY:

Introduction-classification - principle, instrumentation and applications of Thin Layer Chromatography (TLC) - paper chromatography - column chromatography - ion-exchange chromatography - High Performance Liquid Chromatography (HPLC)-Gas Chromatography (GC) - separation of organic mixture using TLC and column chromatography and identification of components of ink using paper chromatography **(12 Hours)**

COURSE BOOKS:

1. R. Gopalan, P.S. Subramanian, K. Rengarajan, Elements of Analytical Chemistry, Sultan Chand & sons, 3rd edition 2004, **Unit I-V**
2. S.M.Khopkar, Basic concepts of Analytical Chemistry, Wiley Eastern Ltd. **Unit IV**
3. A.I Vogel, A Text book of Qualitative Inorganic Analysis, ELBS 4th edition, 2002, **Unit IV**
4. V.K. Srivastava, K.K. Srivastava, Introduction to Chromatography, S. Chand and Company Ltd., 3rd edition,1985, **Unit V**

BOOKS FOR REFERENCE:

1. P.L. Soni, M. Katyal, Test book of Inorganic Chemistry, Sultan Chand and Sons, Reprint, 2015
2. Chatwal Anand, Instrumental methods of chemical analysis, Himalaya Publishing House, 5th edition, 2005

MOLECULES OF LIFE

Semester: V **Hours: 4**

Code : 20CH5DE3B **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify the importance of carbohydrates and their functions.	PSO - 2	K, C
CO - 2	Acquire knowledge on Amino acids , Proteins and Nucleic acids.	PSO - 2	An, E
CO - 3	Identify the biological importance of lipids	PSO - 3	K, E
CO - 4	Examine the types of enzymes and their functions.	PSO - 2	E, S
CO - 5	Analyse the importance of minerals, vitamins and water.	PSO - 3	K, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**MOLECULES OF LIFE**							**Hours: 4**
Code : 20CH5DE3B											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	3	4	3	3	3	3	4	3	4	4	3.45
CO - 2	4	3	3	3	4	3	3	4	3	4	4	3.45
CO - 3	4	4	3	3	3	3	3	4	4	4	4	3.55
CO - 4	3	4	3	3	4	3	3	4	3	4	4	3.45
CO - 5	4	3	3	3	4	3	4	3	4	3	4	3.45
	Overall Mean Score											**3.47**

Result: The score for this course is **3.47** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I

CARBOHYDRATES:

Introduction - classification with examples- manufacture of cane sugar - functions of carbohydrates in the body - energy source, maintenance of heart action and central nervous system- digestion - absorption - metabolism of carbohydrates - bio-synthesis of sugar- tests for carbohydrates - Molisch's, Benedict, Seliwanoff's, iodine, Bial's, Fehlings and Barfoed's test- regulation of blood sugar - diabetes mellitus - sources of carbohydrates in the diet **(12 Hours)**

UNIT II

AMINO ACIDS, PROTEINS AND NUCLEIC ACIDS:

Amino acids: definition- classification of amino acids on the basis of their chemical structure and nutritional requirement- isolation of amino acid from proteins- peptide linkage - polypeptides - proteins: definition - classification based on biological functions - functions of proteins -deficiency diseases - Marasmus and Kwashiorkor tests for proteins - nucleic acids: functions of DNA & RNA - difference between DNA and RNA. **(12 Hours)**

UNIT III

LIPIDS:

Definition - classification - biological significance of lipids - metabolic and structural functions of lipids - digestion of lipids - absorption of lipids - lipid in blood - quantitative analysis of lipids and qualitative tests for lipids- biological importance of cholesterol and bile acids - tests for cholesterol and normal level of cholesterol. **(12 Hours)**

UNIT IV

ENZYMES:

Introduction- general properties - classification- factors influencing enzyme action- regulatory enzymes - allosteric enzymes and covalently modulated enzymes - isoenzymes -industrial and medical applications of enzymes.

(12 Hours)

UNIT V

MINERALS, VITAMINS AND WATER:

Minerals: Introduction - source - function- deficiency and toxicity of calcium, phosphorous, sodium, potassium, iron and iodine - vitamins: classification- source- biological function and deficiency diseases of vitamin A, B, C, D, E and K water: source and distribution of water in the body - functions of water - absorption- metabolism and storage of water. **(12 Hours)**

COURSE BOOKS:

1. V. Alex Ramani, Food Chemistry, MJP Publishers, 2014, **Unit I and II**
2. Carroll Lutz and Karen Przytulski, Nutrition and Diet Therapy, 3rd edition, F.A. Davis Company (Philadelphia) Publishers 2001, **Unit III - V**

BOOKS FOR REFERENCE:

1. M.K. Jain and S.C. Sharma and Fateh Bahadur, Graduate Organic Chemistry, Vishal Publishing Co., Volume - I, 2018-19
2. I.L. Finar, Organic Chemistry, volume II, Dorling Kindersley, 5th edition, 2008
3. P.L. Soni and H.M. Chawla, Text book of Organic Chemistry, Sultan Chand and Sons, Reprint, 2014

FOOD PROCESSING CHEMISTRY

Semester: V **Hours: 4**

Code : 20CH5DE3C **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognize the various methods in food processing	PSO - 2	K, An
CO - 2	Apply skills in processing of fruits and vegetable	PSO - 4	U, Ap
CO - 3	Start small scale unit for food processing	PSO - 5	Ap, An,
CO - 4	Evaluate the chemistry of food additives	PSO - 3	U, Ap, E
CO - 5	Identify the adulterants in food	PSO - 5	Ap, An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**FOOD PROCESSING CHEMISTRY**							**Hours: 4**
Code : 20CH5DE3C											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	4	3	4	3	4	4	4	4	4	3.90
CO - 2	4	4	4	3	3	4	3	3	4	4	4	3.63
CO - 3	3	4	3	4	4	3	3	3	4	4	4	3.54
CO - 4	4	4	4	3	4	4	3	4	3	4	3	3.63
CO - 5	3	4	4	4	4	3	4	4	4	4	3	3.72
Overall Mean Score												**3.68**

Result: The score for this course is **3.68** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I: INTRODUCTION TO FOOD PROCESSING:

Introduction- importance of raw materials in food processing-properties of raw material-raw material cleaning and classifications: dry and wet cleaning, peeling, sorting, grading, cutting, seeding, chilling and freezing- elements of food processing: food safety, food quality, convenient foods - unit operation - unit processing - common unit process: pasteurization, sterilization, drying, separation, evaporation, refrigeration, freezing. **(12 Hours)**

UNIT II: FRUITS AND VEGETABLES PROCESSING:

Introduction - properties of fruits and vegetables - Deterioration reactions in fruits and vegetable: changes in enzymes, chemical changes, nutritional quality changes, physical changes, biological changes - raw materials for fruits and vegetables processing. **(12 Hours)**

UNIT III: SMALL-SCALE FOOD PROCESSING

Processing of cereal and pulses- grain processing: puffing, flaking, milling, doughs and batters, extrusion, baking, frying, porridge-baked products- snack foods processing- manufacture of beverages- coffee processing. **(12 Hours)**

UNIT IV: FOOD ADDITIVES:

Introduction-chemistry of sweeteners: intense sweetuieners, bulk sweeteners - food colours: natural colours, synthetic colours - permitted levels of colourants - list of permitted colourants - flavouring agents-antioxidants: chemistry of antioxidants, type of antioxidants and uses: ascorbic acid, tocoperols, butylated hydroxyanisole (BHA), citric acid, Beta-carotene, lutein - emulisifiers - foodstuff containing emulisifiers - types of emulsions - acidulants: acetic acid, citric acid, lactic acid, malic acid, phoaphoric acid, tartaric acid **(12 Hours)**

UNIT V: FOOD ADULTERATION AND TESTING:

Introduction - Legal Aspects of food adulteration and prevention - common food adulterants - analysis of various food adulterants: analysis of adulterants in edible oils, ghee, coffee powder, chilly powder, turmeric powder, meat and milk-harmful effect of the adulterants.

A) FOOD PRODUCTS:

Wheat and wheat products- classification of wheat - wheat flour - wheat products - milk and milk products - composition of milk - milk grades - some commercial milk products - meat: composition - grades - poultry: composition - composition - analysis - sea foods: composition - analysis of fish **(12 Hours)**

COURSE BOOKS:

1. Vikas Ahlluwalia, A text book of Food Processing Paragon International Publishers, New Delhi, 2007.
2. A text book of Food Chemistry, Alex V Ramani, MJP Publications, Chennai, 2009.

BOOKS FOR REFERENCE:

1. P.J. Fellows, Food Processing Technology. Principles and Practices, Second Edition, Woodland Publishing Ltd, Cambridge, England, 2002.
2. Avantina Sharma, Text Book of Food Science and Technology, International Book, Distributing Co, Lucknow, UP, 2006.
3. Sivasankar, Food Processing and Preservation, Prentice hall of India Pvt. Ltd., NewDelhi. IIIrd Printing, 2005.
4. Peter Zeuthen and Leif Bogh-Sorenson, Food Preservation Techniques, Woodland Publishing Ltd., Cambridge, England, 2005

APPLIED CHEMISTRY

Semester: V **Hours: 2**

Code : 20CH5GE01 **Credits: 2**

COURSE OUTCOMES

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Associating the knowledge on the usage of chemical compounds in various industrial processes.	PSO - 2	U, An, Ap
CO - 2	Recognize the role of chemistry in agriculture	PSO - 3	U, An
CO - 3	Apply skills on sugar manufacturing process and gain knowledge on paints and pigments	PSO - 2	U, An
CO - 4	Equipping skills for entrepreneurship	PSO - 3	U, An, Ap
CO - 5	Describe the different types of polymers and their uses	PSO - 5	U, An, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**APPLIED CHEMISTRY**							**Hours: 2**
Code : 20CH5GE01											**Credits: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	3	4	4	4	3	4	4	4	3	3.73
CO - 2	3	3	4	3	3	3	4	4	3	4	3	3.36
CO - 3	4	3	4	4	3	3	3	4	3	4	4	3.55
CO - 4	4	3	4	3	3	3	3	4	3	4	4	3.45
CO - 5	4	3	4	4	3	3	3	4	3	4	3	3.45
Overall Mean Score												**3.51**

Result: The score for this course is **3.51** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

UNIT I

a) MATCH INDUSTRY: raw materials - manufacturing processes

b) PAPER INDUSTRY: raw materials - manufacturing processes - bleaching - coloring

c) SILICATE INDUSTRY: raw materials and manufacture of cement, glass and ceramics **(6 Hours)**

UNIT II

FERTILIZERS AND PEST MANAGEMENT:

Plant nutrients - definition - nutrient for plant growth - natural and chemical fertilizers - classification - pest management - insecticides - pesticides -fungicides - definition - classification and mode of action. **(6 Hours)**

UNIT III

a) SUGAR INDUSTRY:

Introduction - extraction of juice - purification - defecation - carbonation and sulphitation - concentration - crystallization - separation of crystals - refining - recovery of sugar from molasses.

b) PAINTS AND PIGMENTS:

Classification and constituents of paints - methods of applying and applications - pigments: introduction - white pigments - blue pigments - examples - uses. **(6 Hours)**

UNIT IV

a) DYES:

Introduction - sensation of colors - fibers to be dyed - basic operations in dyeing and formation of dye on the fiber.

b) COTTAGE INDUSTRIAL GOODS:

Preparation of cleaning powder - shampoo - ink - phenoyl - washing powder, candle, rose water, pain relieving balm and hand sanitizer. **(6 Hours)**

UNIT V

POLYMERS:

Fibers - natural fibers: cotton, wool, silk, artificial fibers: rayon, nylon - examples of natural biodegradable polymers: cellulose, cellulose acetate, cellophane Commercial plastics: preparation - uses of polyethylene, PET, PVC, Polypropylene, Bakelite and Teflon. **(6 Hours)**

COURSE BOOK

Study material prepared by the Department of Chemistry, Reprint, 2020

BOOKS FOR REFERENCE:

1. P. L. Soni and H.M. Chawla, Textbook of Organic chemistry, 2007, 29th edition, Sultan Chand and Sons Educational Publishers.
2. P. L. Soni and Mohan Katyal, Textbook of Inorganic Chemistry, 2007, 20th edition, Sultan Chand and Sons Educational Publishers.

GENERIC ELECTIVE (NME)

NATIONAL CADET CORPS

PROGRAMME OUTCOMES (PO)

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario.
2.	Formulate hypothesis, design experiments, use appropriate tools and interpret the results.
3.	Demonstrate the precise understanding of the principles and theories of their discipline through experiments.
4.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
5.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO. NO	UPON COMPLETION OF THE COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
1	Reinforce the aims, motto, vision and mission of the NCC through the academic curriculum.	PO-1, PO-3
2	Train the students, to be graduates with all round development, who apart from their own subject, can successfully compete in other fields such as defense/paramilitary/ police forces and civil services.	PO-1, PO-4
3	Perform in social service activities and creating awareness about social evils in society.	PO-1, PO-5, PO-6.
4	Explain the tri services organization, comprising the army, navy and air force, engaged in grooming the youth of the country into disciplined and patriotic citizens.	PO-2, PO-6
5	Demonstrate "B" and "C" certificate examination of NCC helps in getting jobs in different forces and also security related jobs.	PO-1, PO-2, PO-5,PO-5, PO-6

GENERIC ELECTIVE (NME)

Sem.	Part	Code	Title of Paper	Hours	Credits
V	IV	20GE5NC01	NCC - National Integration and Personality Development	2	2
VI	IV	20GE6NC02	NCC- Organization and Health Programme in NCC	2	2

INTERNAL COMPONENTS

Internal - I	:	30 marks
Internal - II	:	30 marks
Component - I	:	10 marks
Component - II	:	10 marks
Component - III	:	10 marks
Component - IV	:	10 marks
Total	**:**	**100 marks**

NATIONAL INTEGRATION AND PERSONALITY DEVELOPMENT

Semester: V **Hours: 2**

Code : 20GE5NC01 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO – 1	Develop technical skill in Civil defense and self defense in order to safeguard the society in case of need arises	PSO - 1,PSO - 2, PSO - 4	K, An, Ap,
CO – 2	Perceive the importance of Weapon training is to remove the fear of a weapon from the hearts of youth.	PSO - 1, PSO - 4	K, An, C
CO – 3	Comprehend the motivation for positive attitude, character building and personality development.	PSO - 2,PSO - 3, PSO 4, PSO - 5	K, S, Ap
CO – 4	Analyze the different types of disasters under different circumstances.	PSO - 4, PSO - 5	K, An, E
CO – 5	Achieve practical knowledge in community development and other social programmes.	PSO - 1, PSO - 2	K, Ap, S, E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**NATIONAL INTEGRATION AND PERSONALITY DEVELOPMENT**							**Hours: 2**
Code : 20GE5NC01											**Credits: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO – 1	5	3	3	2	2	4	5	4	3	3	5	3.55
CO – 2	5	4	4	2	3	4	5	4	4	4	5	4.00
CO – 3	5	5	4	2	2	3	3	5	3	3	4	4.00
CO – 4	5	4	3	2	2	4	4	5	4	4	5	3.82
CO – 5	5	4	4	2	3	3	5	4	2	5	4	3.73
Overall Mean Score												**3.82**

Result: The Score for this Course is **3.82** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I: NATIONAL INTEGRATION

Motto of National Integration - Importance of National Integration Culture and heritage of Tamil Nadu. **(6 Hours)**

UNIT II: CIVIL AFFAIRS

Aim of aid to civil authority - Role of NCC Cadets during natural calamities - Types of disaster - Essential services during natural calamities **(6 Hours)**

UNIT III: CIVIL DEFENCE AND SELF DEFENCE

Civil Defence - Organization - Aims and services - Aid to Civil authorities in emergency - Self Defence -Aims of Self Defence - Women and Self Defence **(6 Hours)**

UNI IV: LEADERSHIP AND PERSONALITY DEVELOPMENT

Leadership - Types and traits - Man Management in NCC - Duties of a Good Citizen - Role of Youth in Nation Building - Morale - Factors which affect morale - Factors which develop high morale Personality Development - Factor influencing Personality-Time Management . **(6 Hours)**

UNIT V: SOFT SKILLS

Soft skills - interview skill - influencing skill - social skill - communication skill - self motivation - self esteem - body language. **(6 Hours)**

BOOK FOR REFERENCE:

- Mishra R.C., **A Handbook of NCC,** Kanti Prakashan, Etawah, 2000.

INTERNAL QUESTION PATTERN

Time: 2 hours **Marks: 30**

PART - A

Answer Any 4 out of five 4 x 2 = 8

PART- B

Two either or questions (one from each) 2 x 4 = 8

PART - C

Two either or questions (one from each 2 x 7 = 14

SKILL ENHANCEMENT COMPULSORY COURSE
APTITUDE BUILDING - I

Semester: V **Hours: 2**

Code : 20SE5AB03 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain knowledge about operations on numbers and develop skills in problem solving	PSO - 3	K, A, E
CO - 2	Enhance their reasoning capacity	PSO - 3	K, A, E
CO - 3	Improve their reading, writing and speaking skills	PSO - 5	K, A, E
CO - 4	Recognize the importance of computer literacy	PSO - 5	K, A, E
CO - 5	Appear for competitive exams	PSO - 5	K, A, E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V							**APTITUDE BUILDING - I**					**Hours: 2**
Code : 20SE5AB03												**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO-1	5	5	5	5	5	3	2	3	3	2	5	3.90
CO-2	5	5	5	5	5	3	2	3	3	2	5	3.90
CO-3	5	5	5	5	5	3	2	3	3	2	5	3.90
CO-4	5	5	5	5	5	3	2	3	3	2	5	3.90
CO-5	5	5	5	5	5	3	2	3	3	2	5	3.90
Overall Mean Score												**3.90**

Result: The score for this course is **3.90** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

Numerical Ability: Numbers - Highest common factor & Least common multiple of numbers - average - problems on numbers - percentages - problems on ages - percentage - profit and loss - ratio and proportion - time & work

UNIT II

Reasoning: Series completion - analogy - coding & decoding - puzzle test - direction sense test - alphabet test - alpha - numeric sequence puzzle - arithmetic reasoning - inserting missing character - logical sequence of words.

UNIT III

English Language: Spotting errors - Articles - Tenses - Nouns - Pronouns - Adjectives - adverbs - Prepositions - Selecting the most suitable word - Synonyms - Antonyms - Spell check - Double blanks in a sentence.

UNIT IV

General Knowledge: Computer awareness - Classification - Elements of computing process - Programming languages - Computer memory - Software & Hardware - Operating systems - banking awareness - Banking Regulation Act - Reserve Bank of India - Commercial banks - e-banking, Currency system - Money market - Banking and Finance - Indian Monetary Policy.

UNIT V

Current Affairs: National & International Current Affairs - Economy - Sports - Science & Technology - Polity.

COURSE BOOK:

- I. Maria Jesili, Aptitude Building-I A book for Competitive examination, Vol.1, ACCA, Press, J.A. College, Periyakulam.

SKILL ENHANCEMENT COMPULSORY COURSE - APTITUDE BUILDING - I

COMPONENTS OF CIA

Continuous Internal Assessment Component (CIA)

Theory:

Component	Marks
Internal test I	40
Internal test II	40
Mock Interview	15
Attendance	5
Total	**100**

Component	Marks
Logical Reasoning	10
Numerical Aptitude	10
English Language	10
General Knowledge	10
Total	**40**

APTITUE BUILDING I - 20SE5AB03

QUESTION PATTERN

[Internal Examination Only]

MAXIMUM: 80 MARKS **TIME: 1 ½ HOURS**

Section	Type of Question	No. of Questions	No. of Questions to be answered	Marks for each question	Total
A Q.No. (1- 20)	MCQ Questions from Numerical Aptitude	20	20	1	20
B Q.No.(21- 40)	MCQ Questions from Reasoning	20	20	1	20
C Q.No. (41- 60)	MCQ Questions from English Language	20	20	1	20
D Q.No. (61- 80)	General knowledge & Current Affairs	20	20	1	20
Total					**80**

* **OMR** Sheet shall be provided for the examination.

ORGANIC CHEMISTRY - II

Semester: VI **Hours: 6**

Code : 20CH6MC08 **Credits: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Explain relative reactivity of aryl, alkyl and aryl alkyl halides.	PSO - 2, PSO - 3	K, Ap
CO - 2	Recognize the importance of aromatic amino, nitro and diazonium compounds.	PSO - 4	C
CO - 3	Acquire knowledge on molecular rearrangements.	PSO - 5	K, Ap
CO - 4	Gain knowledge about alkaloids and oils and fats.	PSO - 4, PSO - 2	C, K
CO - 5	Explain the structures of amino acids, peptides and proteins.	PSO - 2	An, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**ORGANIC CHEMISTRY - II**							**Hours: 6**
Code : 20CH6MC08											**Credits: 6**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	4	3	4	3	4	4	5	3	4	3.90
CO - 2	4	4	4	3	4	3	3	3	4	4	4	3.64
CO - 3	4	3	3	3	4	4	4	3	4	4	5	3.72
CO - 4	5	4	3	4	4	3	4	5	3	4	4	3.90
CO - 5	4	3	4	4	4	4	4	4	4	3	4	3.81
Overall Mean Score												**3.794**

Result: The score for this course is **3.794** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

a) ARYL HALIDES AND ARYL ALKYL HALIDES:

Introduction - preparation, properties and uses of BHC (addition compound) - nuclear halogen compounds: preparation by direct halogenation, Sandmeyer reaction - benzyne mechanism - relative reactivities with alkyl and aryl alkyl halides - reactions due to the benzene ring - reactions of the halogen atom - preparation and uses of DDT -preparation, properties and uses of benzyl chloride

b) ORGANOSULPHUR COMPOUNDS (NO MECHANISM):

Preparation, properties and uses of thioalcohols, thioethers, mustard gas and thiourea - preparation and uses of aromatic sulphonic acids, aromatic sulphonyl chlorides, sulphonamides, saccharin, chloramines-T, dichloramine-T, sulphaguanidine and sulphanilic acid. **(18 Hours)**

UNIT II

a) ALIPHATIC NITROGEN COMPOUNDS:

Diamide: preparation, properties, uses, structure and estimation of urea (Biochemical method only).

b) AROMATIC NITRO COMPOUNDS:

Preparation - reduction of nitro benzene, electrophilic substitution reactions, nucleophilic substitution reactions -preparation and properties of picric acid and trinitrotoluene (TNT).

c) AROMATIC AMINO COMPOUNDS:

preparation and uses of aniline, diphenylamine, N,N-dimethylaniline, diamines, Michler's ketone and acetanilide - effects of substituents on basic characteristics -- distinction among primary, secondary and tertiary aliphatic and aromatic amines. **(18 Hours)**

UNIT III

MOLECULAR REARRANGENMENTS:

Definition - types: cationotropic, anionotropic, free radical migration - inter and intra molecular rearrangement - definition, example and detailed mechanism of the following: Bechmann, Benzidine, Benzil - Benzilic acid, Claisen, Fries, Hofmann, Pinacol- Pinacolone rearrangement. **(18 Hours)**

UNIT IV

a) ALKALOIDS:

Introduction - nomenclature and classification - occurrence - general properties - isolation - general structure determination - structural elucidation of coniine, piperine and nicotine

b) OILS AND FATS:

Introduction - chemical nature - chemical properties - analysis of fats and oils - acid value - saponification value - iodine value - Reichert-Meissl value - uses - fixed vs volatile oils - mineral oils - drying oils. **(18 Hours)**

UNIT V

AMINO ACIDS, PEPTIDES AND PROTEINS:

Natural α-amino acids - isoelectric point - electrophoresis - synthesis of α-amino acids - physical and chemical properties - structural relationship of amino acids to peptides and proteins - synthesis of peptides: carbobenzoxy ,Sheehan and Merrifield methods - proteins - classification based on composition - general properties - colour tests of proteins: biuret test, ninhydrin test, xanthoproteic test, nitroprusside test, Millon's test, Hopkin's-Cole reaction - structure of proteins: primary, secondary and tertiary structures. **(18 Hours)**

COURSE BOOKS:

1. M.K. Jain, S. C. Sharma and Jyotsna Chaturvedi, Graduate Organic Chemistry, Volume I, Vishal Publishing Co., 3rd edition 2019, **Unit I**
2. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th edition 2014, **Unit II**
3. M.K. Jain, S.C.Sharma and Jyotsna Chaturvedi, Graduate Organic Chemistry, Volume III, Vishal Publishing Co., 3rd edition 2019, **Unit III - V**
4. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th edition, 2007, **Unit V**

BOOKS FOR REFERENCE:

1. K.S.Tewari, N.K. Vishnoi, A Course book of Organic Chemistry, Vikas Publishing House Pvt. Ltd., 3rd edition, 2006
2. V.K.Ahluwalia, Organic Reaction Mechamisms, Narosa Publishing House, 4th edition, Reprint, 2014

PHYSICAL CHEMISTRY - II

Semester: VI **Hours: 6**

Code : 20CH6MC09 **Credits: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on the concept of ionic equilibrium.	PSO - 3	U, Ap, An
CO - 2	Recognise the importance of solid state Chemistry.	PSO - 1	U, An, E
CO - 3	Explain the basic concepts of quantum mechanics and classify the molecules into various point groups.	PSO - 4	U, Ap
CO - 4	Discuss about the importance of chemical kinetics.	PSO - 2	U, Ap
CO - 5	Realize the various physical properties of molecules.	PSO - 1	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**PHYSICAL CHEMISTRY - II**							**Hours: 6**
Code : 20CH6MC09											**Credits: 6**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	4	4	3	3	4	3	4	3	4	3.64
CO - 2	4	4	4	4	3	3	3	5	4	3	3	3.64
CO - 3	4	4	4	4	3	3	4	4	3	4	3	3.64
CO - 4	4	4	4	4	3	3	4	3	4	3	4	3.64
CO - 5	4	4	4	4	3	3	4	3	3	4	3	3.55
Overall Mean Score												**3.62**

Result: The score for this course is **3.62** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

IONIC EQUILIBRIA:

Ionic product of water - pH scale - common ion effect - applications of common ion effect - buffer solutions: weak acid and its salt - weak base and its salt - calculation of pH values of buffer mixtures - Henderson-Hasselbalch equation - hydrolysis of salts - degree of hydrolysis: salts of weak acid and strong base - strong acid and weak base - weak acid and weak base - determination of degree of hydrolysis - indicators: theory of acid - base indicators - action of phenolphthalein and methyl orange - acid base titrations: titration of a strong acid against a strong base - weak acid with strong base - weak base with strong acid - solubility product - molar solubility of a sparingly soluble salt - applications of solubility product **(18 Hours)**

UNIT II

SOLID STATE:

Introduction - difference between crystalline and amorphous solids - size and shape of crystals - symmetry in crystal systems - elements of symmetry of a cubic crystal - point groups - space lattice and unit cell - Bravais lattices - seven crystal systems - density of cubic crystal - law of rational indices - lattice planes and their designation - Weiss and Miller indices - interplanar spacing in a crystal system - X-ray diffraction - the Bragg's equation -experimental methods - power method: the Debye Scherrer method - bcc and fcc lattice - crystal structure of CsCl, NaCl and KCl - band theory of solids - energy band theory of conductors, semiconductors and insulators - superconductivity **(18 Hours)**

UNIT III

a) INTRODUCTION TO QUANTUM MECHANICS:

Introduction - wave and particle nature of radiation - de Broglie equation - wave equation - Heisenberg's principle of uncertainty - difference between classical and quantum mechanics - postulates of quantum mechanics - operators in quantum mechanics - the Schrodinger wave equation (no derivation) - solution of the Schrodinger wave equation : particle in an one dimensional box

b) GROUP THEORY:

Molecular symmetry elements and symmetry operations - products of symmetry operations - properties of a group - classes and sub groups - group multiplication table for C_2v Point groups - classification of molecules into point groups - C_{2v}, C_{3v}, $C_{2h,}$ D_{2h} D_{3h} D_{4h} D_{6h}, T_d and O_h - symmetry operations - reducible and irreducible representations - orthogonality theorem - construction of character table for C_{2v} point group **(18 Hours)**

UNIT IV

CHEMICAL KINETICS:

Rate of a reaction - factors influencing rates of reaction - velocity constant or rate constant - order of reactions: one reactant, two reactant and three reactant - zero order reaction - first order reaction - derivation - hydrolysis of ethyl acetate - half -life period for a first order reaction - methods for determining order of a reaction - molecularity of a reactions - second order reactions - derivation - effect of temperature on reaction rates - concept of activation energy - Arrhenius equation - collision theory - Lindemann theory of unimolecular reactions . **(18 Hours)**

UNIT V

PHYSICAL PROPERTIES AND MOLECULAR STRUCTURE:

Introduction - optical activity - specific rotation - optical activity and molecular structure - dipole moment - polar and non-polar covalent bonds - electric properties of molecules - polarization of a molecule in an electric field - Clausius Mosotti equation - variation of polarization with temperature - Debye equation - measurement of dipole moment : temperature and refraction method - bond moments - dipole moments and molecular structure - magnetic properties of molecules : dia, para and ferromagnetic substances - magnetic susceptibility - measurement of magnetic susceptibility (Gouy's method) - theories of dia and paramagnetic behaviour - ferromagnetism and anti-ferromagnetism - applications of magnetic susceptibility - differences between dia, para and ferromagnetic substances. **(18 Hours)**

COURSE BOOKS:

1. B.R. Puri, L.R. Sharma, Madan S. Pathania and Dr. B.S.Lark, Graduate Physical chemistry, Vishal Publishing Co.,Volume - I **Unit II andIV**
2. B.R. Puri, L.R. Sharma, Madan S. Pathania and Dr. B.S.Lark, Graduate Physical chemistry, Vishal Publishing Co., Volume - II, 2017, **Unit I**
3. B.R. Puri, L.R. Sharma, Madan S. Pathania and Dr. Navjot Kaur, Graduate Physical chemistry, Vishal Publishing Co., Volume - III, 2017, **Unit III and Unit V**
4. B.R. Puri, L.R. Sharma and Madan S. Pathania, Principles of Physical Chemistry, Vishal publishing Co., 47th edition, 2016, New Delhi. **Unit III**

BOOKS FOR REFERENCE:

1. Arun Bahl, B.S. Bahl and G.D. Tuli, Essentials of Physical chemistry, S. Chand and Company Pvt. Ltd. Reprint 2014.
2. K.V. Raman, Group Theory and its applications to Chemistry, Tata McGraw- Hills, Reprint, 1990.

INORGANIC CHEMISTRY - II

Semester: VI **Hours: 6**

Code : 20CH6MC10 **Credits: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Discuss the important characteristics of group 17 elements.	PSO - 1	K, C
CO - 2	Acquire knowledge on chemistry of noble gases and describe the various aspects of metals and metallurgy.	PSO - 2	K,Ap
CO - 3	Explain the concept of organo metallic chemistry.	PSO - 1, PSO - 4	U, An
CO - 4	Discuss the chemical processes involved in polymerization.	PSO - 1, PSO - 3	C,U
CO - 5	Evaluate the biological importance of some metals and acquire knowledge about transport and storage of metals in biological systems.	PSO - 2, PSO - 4	Ap, An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**INORGANIC CHEMISTRY - II**							**Hours: 6**
Code : 20CH6MC10											**Credits: 6**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	3	4	4	4	3	3	3	4	3	3.55
CO - 2	4	4	3	4	4	4	3	4	3	3	4	3.6
CO - 3	4	3	4	4	4	4	4	4	3	3	4	3.6
CO - 4	4	4	4	3	4	4	3	3	4	4	4	3.6
CO - 5	4	4	4	4	4	4	3	4	4	3	3	3.6
Overall Mean Score												**3.58**

Result: The score for this course is **3.58** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

COMPARATIVE STUDY OF COMPOUNDS OF GROUP 17 ELEMENTS:

General characteristic of group 17 elements - hydrides (hydrogen halides) - oxides: oxids of fluorine, chlorine, bromine, iodine - oxo acids of halogens - interhalogens: inter halogens of type XY (diatomic interhalogens) - XY_3 (tetraatomic interhalogens) - XY_5 (hexaatomic interhalogens) - XY_7 (octaatomic interhalogens) - structures of interhalogen compounds - electropositive character of iodine - fluorocarbons. **(18 Hours)**

UNIT II

CHEMISTRY OF NOBLE GASES (GROUP 18):

Occurrence - isolation of noble gases from the atmosphere - electronic configuration of noble gases - general physical properties - utility of noble gases - chemistry of noble gases - preparation, properties and structures of XeF_2, $XeOF_4$, XeO_3 - fluorides of krypton and radon.

METALS AND METALLURGY:

Ores - minerals - differences - purification of ores: various steps involved in metallurgical processes - concentration - froth floatation - roasting - calcination-chemical reduction - refining: zone refining -Van Arkel-de-Boer process - alloys: definition, examples and uses - coin, brass and bronze. **(18 Hours)**

UNIT III

ORGANO METALLIC CHEMISTRY:

Introduction - classification - nomenclature - nature of bonding in metal - alkyl bonds - factors contributing to stability - preparation, properties, bonding and applications: organolithium- organoaluminium - organotitanium compounds - metal carbonyls - inert gas rule (18- electron rule). **(18 Hours)**

UNIT IV

INORGANIC POLYMERS:

Introduction - general properties - glass transition temperature -phosphorous based chain polymers: polyphosphazine, polyphosphonitrilic chlorides - sulphur based polymers: polymericsulphur, polymericsulphur nitride - boron based polymers: polymeric boron nitride - silicon based polymers: silicone rubber - coordination polymers: polymers with cyclopentadienyl rings, polymers with bis chelating agents. **(18 Hours)**

UNIT V

BIOINORGANIC CHEMISTRY:

Introduction - biological functions and toxicity of some trace elements - toxicity of metal ions - metalloporphyrin- cytochrome P450 - haemoglobin and myoglobin - role of myoglobin and haemoglobin in biological systems - role of Na^+ and K^+ ions-role of Mg^{2+} and Ca^{2+} ions -biological fixation of nitrogen - carbonic anhydrase - carboxy peptidase- electron carriers: Fe-S proteins (rubredoxin and ferridoxin) - blue copper proteins -chelating therapy-cis-platin. **(18 Hours)**

COURSE BOOKS:

1. B.R. Puri, L.R. Sharma and K.C. Kalia, Geetanjli Kaushal, Graduate Inorganic Chemistry, Vol- I, Vishal Publishing Co., **Unit I and II**
2. B.R. Puri, L.R. Sharma and K.C. Kalia, Geetanjli Kaushal, Graduate Inorganic Chemistry, Vol III, Vishal Publishing Co., **Unit III-V**
3. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Milestone publishers and Distributor, Delhi, 32nd edition, 2015 **Unit I - V**

BOOKS FOR REFERENCE:

1. P. L. Soni and Mohan Katyal, Textbook of Inorganic Chemistry, Sultan Chand and Sons Educational Publishers, New Delhi, Reprint, 2014.
2. R.D. Madan, Modern Inorganic Chemistry, S. Chand and Company Ltd., 2nd edition, 2002.
3. James E. Huheey, Ellen A. Keiter, Richard L. Reiter and Okhil K. Medhi, Inorganic Chemistry Principles of structure and reactivity, Dorling Kindersley India Pvt. Ltd, 4th edition, 2007.

PRACTICAL: INORGANIC PREPARATION AND GRAVIMETRIC ESTIMATION

Semester: VI **Hours: 4**

Code : 20CH6CP05 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENT WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire the knowledge on preparation of inorganic complexes.	PSO - 2	K, U
CO - 2	Realize the basics of precipitation reactions.	PSO - 4	K, U, An
CO - 3	Apply the practical skills for synthesis and purification.	PSO - 6	U, Ap, An, S
CO - 4	Demonstrate the methods of precipitation and filtration.	PSO - 6	U, Ap, An
CO - 5	Equip with empirical and quantitative skills.	PSO - 3	U, Ap, An, E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**PRACTICAL: INORGANIC PREPARATION AND GRAVIMETRIC ESTIMATION**							**Hours: 4**
Code : 20CH6CP05											**Credits: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	3	4	5	4	2	4	5	4	2	4	3.7
CO - 2	3	4	5	3	4	4	3	5	2	5	3	3.7
CO - 3	4	5	4	3	4	3	3	5	4	3	4	3.8
CO - 4	5	4	2	3	4	5	3	4	5	3	2	3.6
CO - 5	4	3	2	5	4	4	3	4	3	4	5	3.7
Overall Mean Score												**3.7**

Result: The score for this course is **3.7** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

I. PREPARATION OF COMPLEXES

1) Preparation of ferrohexacyanoferrate (III) complex
2) Preparation of tetrammine copper (II) sulphate tetra hydrate
3) Preparation of tris - (thiourea) - copper (II) sulphate dihydrate

II. GRAVIMETRIC ESTIMATION

A) USING SINTERED CRUCIBLE

Estimation of

1. Lead as lead chromate
2. Barium as barium chromate
3. Calcium as calcium oxalate

B) USING SILICA OR PORCELAIN CRUCIBLE

Estimation of

4. Calcium as calcium oxide
5. Water of hydration in a hydrated salt ($BaCl_2$)
6. Barium as barium sulphate

BOOK FOR REFERENCE:

1. V.Venkateswaran, R. Veeraswamy and A. R. Kulandaivelu, Basic principles of Practical Chemistry, Sultan Chand and Sons, 2nd edition, 1997.

SPECTROSCOPY AND ITS APPLICATIONS TO CHEMISTRY

Semester: VI **Hours: 4**

Code : 20CH6DE4A **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain knowledge on basic principles of spectroscopy.	PSO - 5	K
CO - 2	Explain the theory and principles of vibrational spectroscopy and its techniques.	PSO - 1	K, U
CO - 3	Comprehend the basics of Raman and their instrumentation techniques.	PSO - 4	U, C
CO - 4	Explain the basic concepts in NMR with focus on chemical shift, shielding and deshielding and spin-spin splitting.	PSO - 3	K, U
CO - 5	Analyze the physical properties and the structural features and apply spectral techniques in solving structural problems.	PSO - 2, PSO - 3	U, An, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				SPECTROSCOPY AND ITS APPLICATIONS TO CHEMISTRY							**Hours: 4**
Code : 20CH6DE4A											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	4	4	4	3	3	4	3	3	2	3.45
CO - 2	4	4	4	4	4	3	3	4	3	3	2	3.45
CO - 3	4	4	4	4	4	4	3	4	3	3	2	3.64
CO - 4	4	4	4	4	4	4	3	4	3	3	2	3.55
CO - 5	4	4	4	4	4	4	3	4	4	3	2	3.64
Overall Mean Score												**3.55**

Result: The score for this course is **3.55** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

MICROWAVE SPECTROSCOPY :

Introduction to spectroscopy - regions of spectrum- basic features of spectrometers - natural line width collision broadening and Doppler broadening - molecular spectra: Born - Oppenhemier approximation - microwave (rotational) spectra: derivation of energy of diatomic molecules - energy level diagram- relative intensities of rotational spectral lines - applications - use of microwave oven. **(12 Hours)**

UNIT II

VIBRATIONAL (INFRARED) SPECTRA:

Introduction - vibrational spectra of diatomic molecules - force constant - zero point energy - anharmonicity - rotation vibration spectra of diatomic molecules - vibrational frequencies of different functional groups: finger print region - applications of FT - IR spectroscopy: distinction between two types of hydrogen bonding - study of keto-enol tautomerism and conformational analysis. **(12 Hours)**

UNIT III

RAMAN SPECTROSCOPY:

Introduction - quantum theory of Raman scattering - classical theory of Raman scattering - rotation - vibration Raman spectrum - experimental Raman spectroscopy - comparison between IR and Raman spectroscopy. **(12 Hours)**

UNIT IV

UV- VISIBLE SPECTROSCOPY:

Electronic transitions in a diatomic molecule - Frank - Condon principle - electronic energy levels and transitions - shifts in the absorption maxima - effect of conjugation - Woodward Fieser rules for calculating absorption maximum (λ_{max}) in dienes and solvent effect on α, β unsaturated carbonyl compounds - applications of UV spectroscopy. **(12 Hours)**

UNIT V

NMR SPECTRA:

Introduction - nuclear spin and mass number - nuclear magnetic moment - splitting of nuclear energy levels - NMR frequency - Larmor precession of a nucleus in a magnetic field - experimental technique of NMR spectroscopy - chemical shift - TMS - shielding and deshielding of protons - factors affecting chemical shift: inductive effect , van der Waals deshielding, anisotropic effects , hydrogen bonding - spin - spin splitting - coupling constant - NMR spectrum of ethanol - applications of NMR spectroscopy. **(12 Hours)**

COURSE BOOKS:

1. B.R. Puri, L.R.Sharma and Madan S.Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 47th edition, 2016, **Unit I-V**
2. M. K. Jain, S. C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th edition, 2014, **Unit IV and V**

BOOKS FOR REFERENCE:

1. C. N. Banwell and E. M. Mccash, Fundamentals of Molecular Spectroscopy, Tata McGraw-Hill Pvt. Ltd, 4th edition.
2. Y. R. Sharma, Elementary Organic Spectroscopy, Sultan Chand and Sons Reprint, 1st edition, 2011.

NANO CHEMISTRY

Semester: VI **Hours: 4**

Code : 20CH6DE4B **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on fundamentals of nanomaterials.	PSO - 1	K, U
CO - 2	Describe principles of nanoparticle preparation and modification.	PSO - 2	U, C
CO - 3	Analyse the special risks pertaining to nanochemistry and provide perspectives on future nanochemistry developments.	PSO - 3	U, An
CO - 4	Evaluate nanotechnology, the necessary foundation for training in research.	PSO - 5	U, An, E
CO - 5	Insight into the latest development in nanochemistry and nanotechnology.	PSO - 2	U, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**NANO CHEMISTRY**							**Hours: 4**
Code : 20CH6DE4B											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	4	4	2	2	2	4	2	3	3	3.09
CO - 2	4	4	4	4	2	2	2	4	3	3	3	3.18
CO - 3	4	4	4	4	4	3	2	4	2	4	4	3.54
CO - 4	4	4	4	4	4	4	4	4	4	4	4	4
CO - 5	4	4	4	4	4	4	4	4	4	4	4	4
Overall Mean Score												**3.56**

Result: The score for this course is **3.56** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I

PREPARATION OF NANOMATERIALS:

Definition of nanomaterials and nanotechnology - size dependent properties of nanomaterials - alternate approaches for the preparation of nanomaterials - synthetic strategies - gas phase evaporation method - matrix isolation technique - sol-gel processing. **(12 Hours)**

UNIT II

PROPERTIES OF NANOMATERIALS:

Formation of dangling bonds - atom like behaviour of nanoparticles - physicochemical properties - optical properties - electrical and electronic properties. **(12 Hours)**

UNIT III

NANOMATERIALS IN COMMUNICATION SECTOR:

Nanotechnology in electronic communication and informatics - semiconductor lasers- light emitting diode materials - wireless communication - lithography. **(12 Hours)**

UNIT IV

NANOMATERIALS IN POLLUTION ABATEMENT:

Pollution abatement - sensors - green nanotechnology - environmental monitoring and purification through smart particles - nanoscale-biopolymers - nanomaterials as catalysts in green manufacturing **(12 Hours)**

UNIT V

NANOMATERIALS IN DEFENSE SECTOR:

Chemical and biological warfare agents - nanomaterials based detection methods - protection and decontamination through nanomaterials **(12 Hours)**

COURSE BOOK:

B. Viswanathan, Nano materials, Narosa publishing house, New Delhi, 1st edition, 2009 **Unit I - V**

BOOKS FOR REFERENCE:

1. S. Shanmugam, Nanotechnology, MJP Publishers, 2016.
2. M. A. Shah and Tokeer Ahmad, Principles of Nanoscience and Nanotechnology, Narosa Publishing House, 2nd Reprint, 2013.

APPLIED ELECTROCHEMISTRY

Semester: VI **Hours: 4**

Code : 20CH6DE4C **Credits: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain knowledge on the basics of Electrochemistry	PSO - 2	K, An
CO - 2	Recognize the importance in energy conversion	PSO - 4	U, Ap
CO - 3	Acquire the knowledge on batteries and its application	PSO - 5	Ap, An, S
CO - 4	Know the types of electro analytical techniques	PSO - 6	U, Ap, E
CO - 5	Understand the types and mechanism of corrosion	PSO - 5	Ap, An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**APPLIED ELECTROCHEMISTRY**							**Hours: 4**
Code : 20CH6DE4C											**Credits: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	4	3	3	3	3	4	4	4	4	3.72
CO - 2	4	4	4	3	3	4	3	3	3	4	4	3.54
CO - 3	3	4	3	4	4	3	3	4	4	4	4	3.63
CO - 4	4	4	4	3	4	4	4	4	3	4	4	3.81
CO - 5	3	4	4	3	4	3	4	4	3	4	3	3.54
Overall Mean Score												**3.65**

Result: The score for this course is **3.65** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I: ELECTROMOTIVE FORCE:

EMF and Equilibrium constant (K) of a cell reaction - Nernst eqation - concentration cells - electrode concentration cells without transference - electrolyte concentration cells without transference - concentration cells with transference - liquid junction potential (ELJP), electrolyte concentrations cells with salt bridge - application of EMF measurements - determination of activity coefficients of electrolyte - determination of transport number - determination of pH of a solution using hydrogen electrode, quine hydrone electrode and glass electrode - potentiometric titrations. **(12 Hours)**

UNIT II: ELECTROCHEMICAL POWER SOURCES - I:

Principals of energy conservation - electrochemical energy conservation - thermodynamic reversibility - Gibb's equation - classification of batteries , types of electrolytes - battery characteristics - battery specifications - battery components, evaluation of battery performance. **(12 Hours)**

UNIT III: ELECTROCHEMICAL POWER SOURCES - II:

Construction and characteristics of primary batteries: Dry Leclanche cells, alkaline primary batteries and family of lithium batteries - secondary batteries: lead acid -car, traction, stationary, standby and sealed batteries, nickel cadmium - pocket plates and sintered plates - vented and sealed maintenance free designs- fuel cells -introduction, types of fuel cells, advantages - photo electrochemical cells. **(12 Hours)**

UNIT IV: INDUSTRIAL METAL FINISHING:

Introduction - objectives of electroplating - characteristics of electrodeposit and factors - copper electroplating - alkaline and acid bath - chromium electroplating -zinc electroplating - gold plating - anodizing and electroforming. **(12 Hours)**

UNIT V: CORROSION SEIENCE:

Introduction - types of corrosion - theories of corrosion - mechanism of corrosion - dry corrosion -electrochemical corrosion - types - passivity - factors influencing rate of corrosion - nature of metal, environment - phorbaix diagram - corrosion control techniques - inhibitors - cathodic protection methods - corrosion monitoring techniques. **(12 Hours)**

COURSE BOOKS:

1. B.R. Puri, L.R. Sharma, Madan. S Pathaniya and B.S. Lark, Graduate of physical Chemistry (Volume II), Vishal Publishing Co., **Unit -I**
2. Bard & Faulkner, Electrochemical Methods: Fundamentals and Applications, Second edition. **Unit II -V**
3. Fritz Scholz, Electroanalytical Methods - Guide to Experiments and Applications, 2nd Ed, Springer-Verlag Berlin Heidelberg 2010.
4. Joseph Wang, Analytical Electrochemistry, third edition 2006, John Wiley & Sons.

USAGE OF CHEMICALS IN DAILY LIFE

Semester: VI **Hours: 2**

Code : 20CH6GE02 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Realize the importance of chemistry in our biological system.	PSO - 1	C
CO - 2	Recognize the chemicals present in medicines and household products.	PSO - 1, PSO - 4	Ap
CO - 3	Gain knowledge on chemical name and uses of consumer products.	PSO - 4	K, Ap
CO - 4	Recognize the role of chemistry for consumer products used in day today life.	PSO - 4	Ap, E
CO - 5	Identify the polymeric materials used in our daily life.	PSO - 4	K, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**USAGE OF CHEMICALS IN DAILY LIFE**							**Hours: 2**
Code : 20CH6GE02											**Credits: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	4	3	4	5	4	4	4	4	4	4	3.90
CO - 2	4	4	4	4	3	4	3	4	4	3	3	3.63
CO - 3	5	5	4	4	3	4	4	4	3	3	4	3.90
CO - 4	4	4	4	4	5	4	4	4	4	5	5	4.27
CO - 5	4	4	4	4	4	4	4	4	4	4	4	4.00
Overall Mean Score												**3.94**

Result: The score for this course is **3.94** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

HEALTH CARE:

Definition, sources and calorific value of carbohydrates, proteins and fats - need for vitamins in body - types of vitamins- sources and physiological role of vitamin A, B-12, C, D,E,K and folic acid - Role of minerals in body, iodine deficiency and remedy. **(6 Hours)**

UNIT II

a) CHEMOTHERAPY:

Definition and example for sulpha drugs, antibiotics, antimalarials, antipyretics, anaesthetics,antioxidants and antacids

b) HOUSEHOLD PRODUCTS:

Introduction-molecular formula, chemical name and uses of common salt, baking soda, caustic soda, vinegar, sodawater, moth balls, vanaspathi, mosquito coils and safety matches. **(6 Hours)**

UNIT III

CONSUMER PRODUCTS-I:

Soaps and detergents - their action - preparation and uses of bleaching powder, shampoo, talcum powder, alcohol, hand sanitizer, chalk, tooth paste, sugar and candles - disinfectant and antiseptic.

Fuels - classification - solid, liquid and gaseous fuels - nuclear fuel - examples and uses. **(6 Hours)**

UNIT IV

CONSUMER PRODUCTS-II:

Chemical name and uses of food preservatives, flavouring agents,sweetening agents and coloring agents, paper, alloys and utensils, cement - colour chemicals used in paints.

Fertilizers-need, natural sources - chemical fertilizers: urea, NPK fertilizers and super phosphate. **(6 Hours)**

UNIT V

POLYMERS:

Fibers- natural fibers: cotton, wool and silk - artificial fibers: rayon and nylon - examples of natural biodegradable polymers: cellulose, cellulose acetate and cellophane - structure and uses of polyethylene, PET, PVC, polypropylene, bakelite and teflon. **(6 Hours)**

COURSE BOOK:

Study material prepared by the Department of Chemistry

BOOKS FOR REFERENCE

1. Kirpal Singh, Chemistry in Daily Life, PHI learning private Ltd, 3rd edition
2. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2007
3. P.L. Soni, M. Katyal, Test book of Inorganic chemistry, Sultan Chand and Sons, 20th edition, 2006

ORGANIZATION AND HEALTH PROGRAMME IN NCC

Semester: VI **Hours: 2**

Code : 20GE6NC02 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Attain knowledge on History, honors and awards of Indian Military	PSO - 1,PSO - 2, PSO - 4	K, An, Ap,
CO - 2	Perceive knowledge on read the maps, so that they are able to locate themselves when need arises.	PSO - 1, PSO - 4	K, An, C
CO - 3	Explain the medical knowledge which consists of anatomy and physiology of human body.	PSO - 2,PSO - 3, PSO 4, PSO - 5	K, S, Ap
CO - 4	Analyse the personal hygiene and sanitation.	PSO - 4, PSO - 5	K, An, E
CO - 5	Develop technical skill of first Aid and how to effectively deal with minor injuries.	PSO - 1, PSO - 2	K, Ap, S, E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**ORGANIZATION AND HEALTH PROGRAMME IN NCC**								**Hours: 2**
Code : 20GE6NC02												**Credits: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	4	2	2	2	4	5	3	3	5	3.55
CO - 2	4	4	4	2	3	2	4	4	4	4	5	3.64
CO - 3	5	4	3	2	2	3	3	3	5	3	2	3.18
CO - 4	5	5	4	3	2	3	5	5	4	5	3	4.00
CO - 5	4	3	3	3	2	2	4	4	5	5	4	3.55
Overall Mean Score												**3.58**

Result: The Score for this Course is **3.58** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

UNIT I: INDIAN MILITARY AND NCC ORGANIZATION

History of Indian Military - Paramilitary forces - BSF- CRPF and CISF - NCC Organization and History - Aims and Objectives of NCC - Motto of NCC - DG's Four Cardinal Principles of NCC - NCC Song- Ranks in Army, Air force and Navy - Certificate Examination in NCC- Honours and Awards. **(6 Hours)**

UNIT II: MAP READING

Map and its features - kinds of north - Service protractor and Compass-bearing - Conversion of bearings - Conventional signs - Setting of map - Finding own position - Map to ground - Ground to map - Night March chart. **(6 Hours)**

UNIT III: HYGIENE AND SANITATION

Personal Hygiene - Sanitation - Methods of purification of drinking water -Latrine types - Urinal Types. **(6 Hours)**

UNIT IV: TYPES OF DISEASE AND POLLUTION

Define Health - Types of Health - Communicable and Non communicable Disease - Pollution and its type. **(6 Hours)**

UNIT V: FIRST AID

Aims of First Aid - Principle of First Aid - Motto of First Aid - List of items in First aid Box - Types of Bandages - Types of Fracture - Dislocation - Types of Wounds - Burns and Scalds - Sprain - Strain - Asphyxia - Drowning - Poison - Shock - Snake bite - Sun and Heat Stroke - Insect bite - Dog bite - Hanging - Artificial Respiration - Haemorrhage. **(6 Hours)**

BOOK FOR REFERENCE:

Mishra R.C., **A Handbook of NCC,** Kanti Prakashan, Etawah, 2000.

INTERNAL QUESTION PATTERN

Time: 2 hours **Marks: 30**

PART - A

Answer Any 4 out of five 4 x 2 = 8

PART- B

Two either or questions (one from each) 2 x 4 = 8

PART - C

Two either or questions (one from each 2 x 7 = 14

GROUP PROJECT

Semester: VI **Hours: 2**

Code : 20CH6PR01 **Credit : 1**

COURSE OUTCOMES :

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognize the importance of research.	PSO - 1	U,C, An
CO - 2	Apply the different analytical techniques in characterization of compounds.	PSO - 3	C, Ap
CO - 3	Compile the project work.	PSO - 5	Ap, E
CO - 4	Develop the presentation skills through reviews.	PSO - 4	Ap
CO - 5	Provide confidence to take up a task.	PSO - 1	An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**GROUP PROJECT**							**Hours: 2**
Code : 20CH6PR01											**Credits: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	4	5	4	4	4	4	4	4	3	4.09
CO - 2	4	3	4	4	4	3	4	3	4	4	4	3.72
CO - 3	4	4	4	4	4	4	4	3	4	4	5	4.00
CO - 4	4	4	4	4	3	4	4	4	4	4	3	3.81
CO - 5	3	4	4	3	4	4	4	4	4	3	4	3.72
Overall Mean Score												**3.87**

Result: The score for this course is **3.87** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

ENTREPRENEURSHIP SKILLS IN CHEMISTRY

Semester: VI **Hours: 2**

Code : 20SE6CH04 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Predict the meaning of the term entrepreneur.	PSO - 1	K, C
CO - 2	Acquire knowledge on entrepreneurial growth.	PSO - 3	K, Ap
CO - 3	Develop skills in entrepreneurship.	PSO - 4	E, S
CO - 4	Create self employment.	PSO - 2	K,E
CO - 5	Set a Start - up programme to generate income.	PSO - 4	An, E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**ENTREPRENEURSHIP SKILLS IN CHEMISTRY**							**Hours: 2**
Code : 20SE6CH04											**Credits: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	3	4	3	4	4	4	3	4	3	3.64
CO - 2	4	4	4	4	3	4	3	4	3	4	4	3.73
CO - 3	4	4	4	3	4	3	4	4	4	4	3	3.73
CO - 4	4	3	4	4	3	3	4	4	3	4	3	3.54
CO - 5	4	3	4	3	4	3	4	4	3	4	4	3.64
Overall Mean Score												**3.66**

Result: The score for this course is **3.66** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I

THE MEANING AND CHARACTERISTICS OF AN ENTREPRENEUR:

Meaning-origin of the term-definition-need-role and importance of entrepreneurship-scope of entrepreneurial development in chemistry-characteristics of an entrepreneur- relationship between the terms entrepreneur, an entrepreneurial and entrepreneurship **(6 Hours)**

UNIT II

ENTREPRENEURIAL GROWTH:

Role of the government in an entrepreneurial growth-role of governmental and non-governmental agencies in promoting entrepreneurship in India- Women entrepreneurs-definition-steps to encourage women entrepreneurs- business opportunities for women entrepreneurs-small exporters-micro, small and medium enterprises (MSME)- small scale entrepreneurs- small scale units **(6 Hours)**

UNIT III

a) CANDLES:

Raw materials - different types of wax- occurrence - different types of candle moulds - colour and creative designs of candles- laboratory preparation and hands on training

b) PHENYL:

Definition of antiseptics and disinfectants- its action: raw materials - laboratory preparation and hands on training **(6 Hours)**

UNIT IV

Ingredients, laboratory preparation and packaging of washing powder, face powder, cleaning powder and tooth powder **(6 Hours)**

UNIT V

Ingredients and laboratory preparation of tooth paste, shampoo, pain balm, agarpatti, ink and hand sanitiser **(6 Hours)**

COURSE BOOK:

Study material prepared by the department of Chemistry

BOOKS FOR REFERENCE:

1. Jayshree Suresh, Entrepreneurial Develpoement, Margham Publications, 5th edition, 2014
2. B.K. Sharma, Industrial Chemistry, Goel Publishing Home, 13th edition, 2002

PRINCIPLES AND APPLICATIONS OF GREEN CHEMISTRY

Semester: VI

Code : 20CH6SS01 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Apply the principles of green chemistry to carry out the practicals in microscale level.	PSO - 2	K, An
CO - 2	Recognize the impact of green reagents and catalyst.	PSO - 4	U, Ap
CO - 3	Acquire green reactions to have sustainable Environment.	PSO - 5	Ap, An, S
CO - 4	Recall ultrasound assisted green synthesis	PSO - 6	U, Ap, E
CO - 5	Gain knowledge on biocatalysts in organic synthesis.	PSO - 5	Ap, An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**PRINCIPLES AND APPLICATIONS OF GREEN CHEMISTRY**							**Credits: 2***
Code : 20CH6SS01											
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	4	3	3	3	3	4	4	4	4	3.72
CO - 2	4	4	4	3	3	4	3	3	3	4	4	3.54
CO - 3	3	4	3	4	4	3	3	4	4	4	4	3.63
CO - 4	4	4	4	3	4	4	4	4	3	4	4	3.81
CO - 5	3	4	4	3	4	3	4	4	3	4	3	3.54
Overall Mean Score												**3.65**

Result: The score for this course is **3.65** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

BASIC PRINCIPLES OF GREEN CHEMISTRY:

Prevention of waste - maximum incorporation of the reactants into the final product - minimization of hazardous products - designing safer chemicals - energy requirements for synthesis - selection of appropriate solvent - selection of starting materials - use of protecting groups - use of catalyst - products designed should be biodegradable - designing of manufacturing products - strengthening of analytical techniques

UNIT II

a) GREEN REAGENTS AND GREEN CATALYST:

Introduction - designing a green synthesis: choice of starting materials, reagent, catalyst and solvents - dimethyl carbonate - polystyrene Wittig reagent - polymeric phenyl thiomethyl lithium reagent - oxidation catalyst - basic catalyst - titanium dioxide photocatalyst in green chemistry

b) GREEN CHEMISTRY IN DAY TODAY LIFE:

Dry cleaning of cloths - versatile bleaching agent - environmental pollution

UNIT III

MICROWAVE ASSISTED SYNTHESIS:

Microwave assisted synthesis in water: hydrolysis of benzyl chloride - benzamide - N-phenyl benzamide - oxidation of toluene and alcohols - microwave assisted synthesis in organic solvents: esterification and Fries rearrangement

UNIT IV

ULTRASOUND ASSISTED GREEN SYNTHESIS:

Introduction - application: esterification, saponification, hydrolysis, oxidation and reduction

UNIT V

BIOCATALYSTS IN ORGANIC SYNTHESIS:

Introduction - biochemical oxidation and reduction - enzymes catalysed hydrolytic process: hydrolysis of N-acylamino acids

COURSE BOOK:

1. V. K. Ahluwalia and M. Kidwai, New Trends in Green Chemistry, Anamaya Publishers, New Delhi, 1st reprint of 2nd edition, 200 **Unit I - V**

BOOKS FOR REFERENCE:

1. V. K. Ahluwalia, Green Chemistry Environmentally Benign Reaction, Ane Books Pvt. Ltd., Reprint 2009.
2. Rashmi Sanghi and M. M. Srivastava, Green Chemistry Environment Friendly Alternatives, Narosa Publishing House Pvt. Ltd., Fifth Reprint 2012.

HERBAL CHEMISTRY

Semester: VI

Code : 20CH6SS02 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on medicinal plants diversity.	PSO - 2	K, An
CO - 2	Recall the aroma of some medicinal aromatic plants.	PSO - 4	U, Ap
CO - 3	Come to know the development of medicinal plants.	PSO - 5	Ap, An
CO - 4	Identify the medicinal values of some species in India.	PSO - 3	U, Ap, E
CO - 5	Recognize the importance of medicinal plants.	PSO - 5	Ap, An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**HERBAL CHEMISTRY**							**Credits: 2***
Code : 20CH6SS02											
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	4	3	3	3	3	4	4	4	4	3.72
CO - 2	4	4	4	3	3	4	3	3	3	4	4	3.54
CO - 3	3	4	3	4	4	3	3	4	4	4	4	3.63
CO - 4	4	4	4	3	4	4	4	4	3	4	4	3.81
CO - 5	3	4	4	3	4	3	4	4	3	4	3	3.54
Overall Mean Score												**3.65**

Result: The score for this course is **3.65** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I

MEDICINAL PLANTS DIVERSITY:

Introduction to the medicinal chemistry of herbs - priority species - scope and reasons of cultivation - propagation mode - conservation strategies - marketing constraints - future strategies.

UNIT II

MEDICINAL AROMATIC PLANTS:

Introduction - history - market of medicinal and aromatic - prioritized identified medicinal plants - drawbacks in marketing of medicinal plants - situation of medicinal plants in nature.

UNIT III

DEVELOPMENT OF MEDICINAL PLANTS SECTOR IN INDIA:

Medicinal plants - traditional medicine - threats of medicinal plants in India - measures for conservation: In-situ conservation - Ex-situ conservation - advantages of cultivation of wild medicinal plants - current status - factors limiting medicinal plants cultivation.

UNIT IV

MEDICINAL VALUES OF SOME IMPORTANT SPECIES:

Introduction - chemical constituent, edible and medicinal uses: bistorta, fagopyrum dibotrys, persicaria barbata, persicaria chinensis, polygonum plebeium and rumex vesicarius.

UNIT V

MEDICINAL VALUES OF SOME COMMON PLANTS:

Introduction - medicinal uses: okra, onion, garlic, turmeric, spinach, garden mint, black pepper, wood apple, lantana, aloe, jack fruit, banana and sugarcane.

COURSE BOOK:

1. http://phrmafacts.com/medicinal-chemistry-of-herbs/ **Unit I**
2. D. Marngar and S. Jyrwa, Biodiversity: Herbal Medicine, Akansha Publishing House, New Delhi, 1st published, 2009 **Unit I - V**

BOOK FOR REFERENCE:

1. P. Agarwal Shasi, Alok, Fatima and Verma. A, Current Scenerio of Herbal Technology Worldwide: An overview, Int J Pharm Sci Res., 4(11), 4105-17, 2013.

ENERGY FOR THE FUTURE

Semester: VI

Code : 20CH6SS03 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on various sources of energy.	PSO - 2	K, An
CO - 2	Evaluate the importance of solar energy.	PSO - 4	U, Ap
CO - 3	Come to know the development of wind energy.	PSO - 5	Ap, An,
CO - 4	Describe about the biomass conversion techniques.	PSO - 3	U, Ap, E
CO - 5	Recognize the importance of fuel cells.	PSO - 5	Ap, An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**ENERGY FOR THE FUTURE**							**Credits: 2***
Code : 20CH6SS03											
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	4	3	3	3	3	4	4	4	4	3.72
CO - 2	4	4	4	3	3	4	3	3	3	4	4	3.54
CO - 3	3	4	3	4	4	3	3	4	4	4	4	3.63
CO - 4	4	4	4	3	4	4	4	4	3	4	4	3.81
CO - 5	3	4	4	3	4	3	4	4	3	4	3	3.54
Overall Mean Score												**3.65**

Result: The score for this course is **3.65** (Very High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I: INTRODUCTION TO ENERGY SOURCES:

Introduction - energy consumption as a measure of prosperity- world energy futures - conventional energy sources - coal - oil - gas - agricultural and organic wastes - water power - thermal power and nuclear power. New energy technologies- Non -conventional energy sources - solar energy - wind energy - energy from bio-mass and bio-gas - ocean thermal energy - tidal energy - geothermal energy and hydrogen energy. Renewable energy resoureces.

UNIT II: SOLAR ENERGY:

Solar radiation and its measurement - introduction - solar constant - solar radiation at the earth's surface - solar radiation geometry and solar radiation data. Solar energy collectors - introduction - physical principles of the conversion of solar radiation into heat - flat plate and concentration collectors-solar energy storage: introduction - solar energy storage system: sensible heat storage and latent heat storage- applications of solar energy: solar water heating and space heating.

UNIT III: WIND ENERGY:

Introduction - basic principles of wind energy conversion - power in the wind-Wind energy conversion - wind data and estimation - site selection. Types of wind machines - horizontal axis and vertical axis machines-performance of wind machines-Generating systems -introduction - schemes of electric generation - generator control - load control and energy storage. Application of wind energy

UNIT IV: BIO-ENERGY:

Introduction - biomass conversion techniques: wet processes and dry processes-Biogas generation. Classification of biogas plants -advantages and disadvantages of floating drum plant- types of biogas plants-Biogas from plant waste- Materials used for biogas generation - selection of site for a biogas plant and digester design-Fuel properties and utilization of biogas.

UNIT V: CHEMICAL ENERGY SOURCES:

Fuel cells -introduction - conversion efficiency of fuel cells - types of electrodes - work output and EMF of fuel cells. Applications of fuel cells.Hydrogen energy.Hydrogen production - electrolysis - thermo-chemical - fossil fuel and solar energy methods.Hydrogen storage and hydrogen transportation.Utilization of hygrogen gas.Hydrogen as an alternative fuel for motor vehicles.Safety and management

COURSE BOOKS:

1. Rai, G.D., Non-conventional Energy Sources, Khanna Publications, India
2. Wengenmayr, R., Bührke, T. &Brewer, W.D., Renewable Energy, Sustainable Energy Concepts for the Energy Change, second edition, New York: Wiley VCH.
3. Nelson, V., Introduction to Renewable Energy (Energy and the Environment), New York: CRC Press.
4. Twidell, J. & Weir., Renewable Energy Resources, second edition, New York, Taylor and Francis.

BOOKS FOR REFERENCE:

1. Chiras, D. Achieving Energy Independence through Solar, Wind, Biomass and Hydropower. Mother Earth News Wiser Living, 2006
2. Tester, J.W., Drake, E.M., Driscoll, M.J., Golay, M.W., & Peters, W.A. Sustainable Energy., second edition, New Delhi: Prentice-Hall of India, 2006

POLYMER CHEMISTRY

Semester: VI

Code : 20CH6SS04 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Classify the polymers based on different aspects.	PSO - 2	K, U
CO - 2	Recognize the microstructure of polymers.	PSO - 4	U, Ap
CO - 3	Appreciates the use of polymers in our day to day life.	PSO - 5	K,Ap,
CO - 4	Gain knowledge on specific applications of polymers.	PSO - 3	U, Ap,
CO - 5	Recall the importance of biodegradable polymers and quality checking.	PSO - 5	Ap, An

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**POLYMER CHEMISTRY**							**Credits: 2***
Code : 20CH6SS04											
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	4	3	3	3	3	4	4	4	4	3.72
CO - 2	4	4	4	3	3	4	3	3	3	4	4	3.54
CO - 3	3	4	3	4	4	3	3	4	4	4	4	3.63
CO - 4	4	4	4	3	4	4	4	4	3	4	4	3.81
CO - 5	3	4	4	3	4	4	4	4	3	4	4	3.73
Overall Mean Score												**3.69**

Result: The score for this course is **3.69** (Very High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I

a) MICROSTRUCTURE BASED ON THE CHEMICAL STRUCTURE:

Introduction - classification of polymers based on origin, mode of formation, structure and application - organic and inorganic polymers, homochain and heterochain polymers, homopolymer and co polymers.

b) MICROSTRUCTURE BASED ON THE GEOMETRICAL STRUCTURE:

Linear, branched and cross-linked polymers, random, alternating, block and graft copolymers and stereo-regular polymers

UNIT II

Types of polymerization: addition and condensation - addition polymers**:** preparation, structure and uses of polyethylene, polypropylene, polystyrene, polyvinylchloride, polytetrafluoroethylene, polymethylmethacrylate, polyacrylonitrile, polyvinylacetate, polychloroprene and styrene-butadiene and natural rubber

UNIT III: IMPORTANT CONDENSATION POLYMERS:

Preparation, structure and uses of polyamides, polyesters, phenol-formaldehyde resin, cellulose acetate, silicones and polyurethanes

UNIT IV: SPECIFIC APPLICATIONS:

Polymers as adhesives and fillers - common plastic polymers used in packaging: polyethylene terephthalate, high density polyethylene and low density polyethylene

UNIT V

a) BIODEGRADABLE PLASTICS:

Composition of biodegradable plastics - starch-based plastics - bacteria based plastics -soy-based plastics - biodegradable polyesters -biopolymers: definition, example and applications

b) QUALITY OF POLYMERS:

Permissible limit of microns in polythene bags - grades of plastic bottles

BOOKS FOR REFERENCE:

1. V.R. Gowariker , N.V.Viswanathan and Jayadev Sreedhar, Polymer Science, New age Intrnational Pvt.Ltd., Publishers, Reprint 2014, **UNIT I and II**
2. K. Bagavathisundari, Applied Chemistry, MJP Publishers, 2nd edition, 2008, **UNIT III, IV and V**
3. **https://plasgranltd.co.uk/plasgran-guide-plastic-recycling-grades/ Unit V**
4. **https://www.quora.com/Why-is-the-allowed-limit-of-polythene-bags-in-India-40-micron-Are-polythene-bags-lesser-than-40-not-recyclable Unit V**

STUDENT TRAINING PROGRAMME
NATIONAL CADET CORPS

U.G. PROGRAMME OUTCOMES (2020 - 2023)

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the expertise of their discipline in related scenario.
2.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
3.	Accomplish the basic understanding of the relationship between education and human life and enhance their perspectives on the various functions of their studies in the diverse contexts of the society.
4.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
5.	Develop skills like collaboration, higher-order thinking, problem solving and self-direction through effective use of technologies and resources.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities such as self-esteem, positive attitude, self-discipline, and self-motivation.

PROGRAM SPECIFIC OUTCOMES (PSO)

PSO NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
1	Reinforce the aims, motto, vision and mission of the NCC through the academic curriculum.	PO-1, PO-3
2	Train the students, to be graduates with all round development, who apart from their own subject, can successfully compete in other fields such as defense/paramilitary/ police forces and civil services.	PO-1, PO-4
3	Perform in social service activities and creating awareness about social evils in society.	PO-1, PO-5, PO-6.
4	Explain the tri services organization, comprising the army, navy and air force, engaged in grooming the youth of the country into disciplined and patriotic citizens.	PO-2, PO-6
5	Demonstrate "B" and "C" certificate examination of NCC helps in getting jobs in different forces and also security related jobs.	PO-1, PO-2, PO-5,PO-5, PO-6

NATIONAL CADET CORPS

Semester: I - IV **Hours: 240**

Code : 20STPNC01 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Attain knowledge on History, honors and awards of Indian Military.	PSO - 1,PSO - 2, PSO - 4	K, An, Ap,
CO - 2	Perceive knowledge on read the maps and Weapon training is to remove the fear of a weapon from the hearts of youth.	PSO - 1, PSO - 4	K, An, C
CO - 3	Analyze the different types of disasters under different circumstances.	PSO - 2,PSO - 3, PSO 4, PSO - 5	K, S, Ap
CO - 4	Achieve practical knowledge in community development and other social programmes.	PSO - 4, PSO - 5	K, An, E
CO - 5	Comprehend the personality development and develop technical skill of first Aid .	PSO - 1, PSO - 2	K, Ap, S, E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I - IV				**NATIONAL CADET CORPS**							**Hours: 240**
Code : 20STPNC01											**Credits: 2***
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	3	3	3	4	3	4	4	3	3	3	3.4
CO - 2	3	4	3	3	4	3	4	4	3	4	4	3.54
CO - 3	3	3	4	4	4	4	3	4	4	3	5	3.72
CO - 4	3	3	4	5	4	4	3	3	4	5	4	3.81
CO - 5	3	3	5	4	3	4	3	3	4	5	4	3.72
Overall Mean Score												**3.64**

Result: The score for this course is **3.64** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

NATIONAL CADET CORPS

Semester: I - IV **Hours: 240**

Code : 20STPNC01 **Credits: 2***

UNIT I: ARMED FORCES AND MILITARY HISTORY

Army, Police and Central Armed Police Forces, Modes of Entry into Army, Police and CAPF, Aims and Objectives of NCC , Organisation, Training and NCC Song , Incentives , Honors and Awards, Biographies of Renowned Generals, War Heroes : Param Veer Chakra Awardees, Study of Battles of Indo-Pak Wars 1965, 1971, & Kargil, War Movies, "B" and "C" certificate examinations.

UNIT II: MAP READING, FCBC AND WEAPON TRAINING

Introduction to Map Reading, Conduct of Map Reading, Introduction to Field Craft and Battle Craft, Indication of landmark, Observation, Camouflage & Concealment, Fire and Move Capsule, Knots, Lashing and Strecthers, Organisation of Infantry Battalion & its weapons. Characterstics of a Rifle and its Ammunition, Stripping, Assembling, Care, and Cleaning of 7.62 SLR, Loading, Cocking and Unloading, Lying Position, Holding and Aiming, Trigger Control and Firing a Shot, Theory of Group and Snap Shooting, Obstacle Training

UNIT III: DISASTER MANAGEMENT AND CIVIL AFFAIRS

Civil Defence Organisation and NDMA, Types of Emergencies / Natural Disasters, Fire Services & Fire Fighting, Traffic Control During Disaster Under Police Supervision, Collection & Distribution of Aid Material, Essential Services and their Maintenance. Aim of aid to civil authority – Role of NCC Cadets during natural calamities – Types of disaster– Essential services during natural calamities

UNIT IV: NATIONAL INTEGRATION AND SOCIAL AWARENESS

Basics of Social Service and Its Need, NGOs Role & Contribution, Drug Abuse and Trafficking, Causes & Prevention of HIV / AIDS and Role of Youth, Counter Terrorism, Traffic Control Organisation and Anti Drunken Driving, Religions, Culture, Traditions and Customs of India. National Interests, Objectives, Threats and Opportunities. Unity in Diversity. National Integration Council. Contribution of Youth in Nation Building. Leaders of Political / Regional Parties, Media Persons, Women Representatives, Eminent Public Representatives, Representatives of Business

UNIT V: PERSONALITY DEVELOPMENT, LEADERSHIP AND FIRST AID

Factors Influencing and Shaping Personality : Physical, Social, Psycological and Philosophical Types of Leadership, Time Management, Stress Management Skills, Interview Skills, Sociability : Social Skills Ettiquettes And Mannerism, Injuries to Internal Organs, Burns and Scalds, Snake Bite, Scorpion Bite & Rabid Dog Bite, Foreign Bodies in Eye, Ear and Nose, Insensibility or Unconsciousness, Artificial Respiration.

BOOK FOR REFERENCE

- Mishra R.C., **A Handbook of NCC,** Kanti Prakashan, Etawah, 2000.

Scheme of Evaluation	
Summative Examination (2 hours)	25 Marks
Continuous Internal Assessment	75 Marks
Total	**100 Marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	Attendance - 240 hours	10 Marks
2.	Special Camp	40 Marks
3.	"B" and "C" certificate examination	25 Marks
Total		**75 Marks**

Question Pattern for Summative Examination

Total Marks: 40 **Time: 2 hours**

Section - A

Answer All Questions 5 × 1 = 5 Marks
(Multiple Choice Questions)

Section - B

Answer All Questions 2 × 5 = 10 Marks
(Either Or Questions)

Section - C

Answer Any one Questions 1 × 10=10 Marks
(one Question Out of Two)

NATIONAL SERVICE SCHEME

U.G. PROGRAMME OUTCOMES (2020 - 2023)

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the expertise of their discipline in related scenario.
2.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
3.	Accomplish the basic understanding of the relationship between education and human life and enhance their perspectives on the various functions of their studies in the diverse contexts of the society.
4.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
5.	Develop skills like collaboration, higher-order thinking, problem solving and self-direction through effective use of technologies and resources.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities such as self-esteem, positive attitude, self-discipline, and self-motivation.

PROGRAM SPECIFIC OUTCOMES (PSO)

PSO NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO - 1	Understand and identify the needs of the community	PO1, PO3
PSO - 2	Develop among themselves a sense of social and civic responsibility.	PO2, PO3, PO4, PO6
PSO - 3	Apply their education in finding practical solution to individual and community problems.	PO1, PO3, PO4, PO6
PSO - 4	Acquire leadership qualities and democratic attitude.	PO2, PO3, PO5
PSO - 5	Develop capacity to meet emergencies and national disasters and practice national integration and social harmony	PO3, PO4, PO5

NATIONAL SERVICE SCHEME

Semester: I - IV **Hours: 240**

Code : 20STPNS01 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Attain a Citizen with Social Concern and Social Analysis	PSO - 1, PSO - 2, PSO - 5	An
CO - 2	Flourish physical and mental health through Yoga	PSO - 2, PSO - 4	Ap
CO - 3	Practice to have healthy Food	PSO - 3, PSO - 5	S, Ap
CO - 4	Preserve Environment	PSO - 2, PSO - 3, PSO - 4	C, K, Ap
CO - 5	Understand and Challenge problems of Women.	PSO - 1, PSO - 2, PSO - 5	An, Ap, K

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I - IV				NATIONAL SERVICE SCHEME							Hours: 240
Code : 20STPNS01											Credits: 2*
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	3	3	5	4	3	3	3	5	3	3	5	3.64
CO - 2	3	4	3	2	4	3	4	5	4	5	2	3.55
CO - 3	3	3	4	3	3	4	3	3	5	3	5	3.55
CO - 4	2	2	3	3	2	3	3	5	5	5	3	3.27
CO - 5	3	3	5	3	3	4	5	5	3	3	5	3.82
Overall Mean Score												3.56

Result: The score for this course is **3.56** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I: BASICS OF NSS

Introduction - History and Growth - Objectives - NSS Motto - NSS Symbol - NSS Badge - NSS Day - Composition of NSS Unit - NSS Regular Activities & Special Camp - Village Survey & Volunteers Diary - Campus Work - National and International Important days - NSS Awards.

UNIT II: CITIZENSHIP

Duties of a citizen - Social Service - Social Problems - Need for Social Service - Leadership - Social Service & Leadership quality- Personnel and Social Values.

UNIT III: YOUTH

Introduction - Education & Social Concern - Youth & Family - Youth & Society - Capability of youth - Problems of Youth - Drug Abuse - Hero Worship - Addict to Social Media - Violence - Sexual Problems - Suicide.

UNIT IV: HEALTH & HYGIENE

Introduction - Health & Hygiene - Food Hygiene - Personal Hygiene - Health Maintenance: Care of Skin, Hair, Teeth, Eyes - Health Assessment of Fitness - Approaches for keeping Fit.

UNIT V: FOOD AND NUTRITION

Food - Nutrients - Components of Food: Carbohydrate, Protein, Lipid, Minerals, Vitamins and Water - Balanced Diet: Food Selection and Meal Planning - Caloric value of Fruits, Vegetables, Nuts and Sprouted Seeds.

UNIT VI: ENVIRONMENT AND ECOLOGY

Ecology - Components of Ecology - Environment - Pollution - Water Pollution - Air Pollution - Soil Pollution - Noise Pollution - Pollution Control & Environment Preservation.

UNIT VII: WOMEN EMPOWERMENT

Women - Women & Family - Women & Society - Women & Education - Women Leaders - Women Problem - Women Empowerment to overcome problems.

UNIT VIII: FIRST AID

Principles of First Aid - First aid for burns and scalds - First aid for fractures - First aid for insect bite - First aid for dog bite - First aid for electric shock - First aid for drowning - First aid for haemorrhage - Important things kept in the first aid box.

UNIT IX: YOGA

Origin of Yoga and its development - Human Body & Mind - Benefits of Yoga - Classification of Yoga - Pranayama - Types of Pranayama - Utkatasana (Chair Pose) - Trikonasana (Triangle Pose).

UNIT X: PRACTICAL KNOWLEDGE

Entrepreneurial Training: Phenol, Soap Powder, Soap, Candle and Ornaments Making - Gardening - Solid Waste Management - Special Camp: 7 Days

BOOKS FOR REFERENCE:

1. C.S.C. Herve Morrissette, Youth aware, Holy cross fathers, Bangalore, 1977, Seema Yadav, Food Hazards and Hygiene, Anmol Publications Pvt. Ltd, New Delhi, Ist edition, 1997
2. Gitanjali Chatterjee, Hand Book of Food and Nutrition, Rajat Publications Pvt. Ltd, 2000,
3. Archana Sharma, Environment: Ecology, Climate change, Global warming, Biology Biodiversity, Conservation, Face the Challenge Academy, 2018,
4. Jaimon Varghese, Women Empowerment Through Literacy Campaign, Concept Publishing Company Pvt. Ltd, 2012.
5. Rajeev Sharma, First Aid, Lotus Press, New Delhi-2, 2009.
6. Amresh Kumar, Yoga for Healthy body, Khel Sahitya Kendra, New Delhi-2, 2009.

Scheme of Evaluation	
Summative Examination (2 hours)	40 Marks
Continuous Internal Assessment	60 Marks
Total	**100 Marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	Attendance - 240 hours	10 Marks
2.	Special Camp	40 Marks
3.	Case Study	10 Marks
Total		**60 Marks**

Question Pattern for Summative Examination

Total Marks: 40 **Time: 2 hours**

Section - A

Answer All Questions 10 × 1=10 Marks
(Multiple Choice Questions)

Section - B

Answer All Questions 2 × 5=10 Marks
(Either Or Questions)

Section - C

Answer Any Two Questions 2 × 10=20 Marks
(Two Questions Out of Three)

PHYSICAL EDUCATION

U.G. PROGRAMME OUTCOMES (2020 - 2023)

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the expertise of their discipline in related scenario.
2.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
3.	Accomplish the basic understanding of the relationship between education and human life and enhance their perspectives on the various functions of their studies in the diverse contexts of the society.
4.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
5.	Develop skills like collaboration, higher-order thinking, problem solving and self-direction through effective use of technologies and resources.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities such as self-esteem, positive attitude, self-discipline, and self-motivation.

PROGRAM SPECIFIC OUTCOMES (PSO)

PSO NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
1	Elucidate basic knowledge and professional experience in Yoga	PO-1, PO-3
2	Equip with the profound knowledge of Sports and Games	PO-1, PO-4
3	Intake balanced nutrition and practice hygiene.	PO-1, PO-5, PO-6.
4	Enlighten the peoples with the principles of first aids	PO-2, PO-6
5	Expound the concepts and demonstrate Aerobics and Pyramids	PO-1, PO-2, PO-5,PO-5, PO-6

PHYSICAL EDUCATION - COURSE PATTERN (2017 - 2020)

Sem.	Code	Title of the Paper	Hours	Credits
I & II	20STPPE01	Yoga and Rhythmic Activities	120	-
III & IV		Fundamentals of Physical Education	120	2*
		Total	**240**	**2***

YOGA AND RHYTHMIC ACTIVITIES

Semester: I & II **Hours: 120**

Code : 20STPPE01

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the principle of Asnas	PSO - 1,PSO - 3, PSO - 4	K, An, Ap,
CO - 2	Classify Pranayama for different needs	PSO - 1, PSO - 4	K, An, C
CO - 3	Appraise the application and effects of Suryanamaskar for human wellness	PSO - 2,PSO - 3, PSO 4, PSO - 5	K, S, Ap
CO - 4	Execute the techniques in Free Hand Exercise	PSO - 4, PSO - 5	K, An, E
CO - 5	Construct Pyramids based on the underlying principles	PSO - 1, PSO - 2	K, Ap, S, E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I - II				**PAPER I – YOGA AND RYTHEMIC ACTIVITIES**							**Hours: 120**
Code : 20STPPE01											
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	4	2	2	2	4	5	3	3	5	3.55
CO - 2	4	4	4	2	3	2	4	4	4	4	5	3.64
CO - 3	5	4	3	2	2	3	3	3	5	3	2	3.18
CO - 4	5	5	4	3	2	3	5	5	4	5	3	4.00
CO - 5	4	3	3	3	2	2	4	4	5	5	4	3.55
Overall Mean Score												**3.58**

Result: The score for this course is **3.58** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I: ASNAS

Sitting Postures - Standing Posture - Prone Posture - Supine Postures.

(24 hours)

UNIT II: PRANAYAMA

Pranayama - Suga Pranayama - Chandra bethana - Nadi Sudhi - Ujjayee - Seethali - Seethakari - Brahmari. **(24 hours)**

UNIT III: SURYANAMASKAR

Suryanamaskar: 12 Postures - 12 Postures & Breathe consioius - 12 Postures With manthra - Relaxation Techiniques. **(24 hours)**

UNIT IV: CALLISTHENICS (FREE HAND EXERCISE)

Standing series - Bending series - Sitting series - Twisting series - Dumb - bells - Indian Clubs - Lezium - Hoops. **(24 hours)**

UNIT V: AEROBICS & PYRAMIDS

Aerobics: Aerobic Basics - Aerobic Movements - Aerobic With Rhythm - Aerobic Programme Pyramids: Basics of Pyramids - Types of Pyramids. **(24 hours)**

BOOKS FOR REFERENCE:

1. Wuest Jeborah,A and Charles A. Bucher (1987), 'Foundation of Physical Education, B.I Publication Pvt.Ltd., New Delhi.
2. Elangovan.R, (2002), 'Utarkalvi Oru Arimugam', Ashwin Publication, Triunelveli.
3. Chandrasekaran.K, (1999), 'Sound Health through Yoga, Prem Kalyan Publication, Sedapatti.
4. Iyengar, B.K.S,'Lights on Yoga', Unwin Hyman Company, London

FUNDAMENTALS OF PHYSICAL EDUCATION

Semester: III & IV **Hours: 120**

Code : 20STPPE01 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
1.	Familiarize the fundamentals of Physical Education	PSO - 1, PSO - 3, PSO - 4	K, An, Ap,
2.	Illustrate different rules for different games and athletic events	PSO - 1, PSO - 4	K, An, C
3.	Examines the need for good nutrition	PSO - 2, PSO - 3, PSO 4, PSO - 5	K, S, Ap
4.	Synthesis the relation between hygiene and health	PSO - 4, PSO - 5	K, An, E
5.	Apply the first aid techniques	PSO - 1, PSO - 2	K, Ap, S, E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III - IV				PAPER II - FUNDAMENTALS OF PHYSICAL EDUCATION							Hours: 120
Code : 20STPPE01											Credits: 2*
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	3	3	2	2	4	5	4	3	3	5	3.55
CO - 2	5	4	4	2	3	4	5	4	4	4	5	4.00
CO - 3	5	5	4	2	2	3	3	5	3	3	4	4.00
CO - 4	5	4	3	2	2	4	4	5	4	4	5	3.82
CO - 5	5	4	4	2	3	3	5	4	2	5	4	3.73
Overall Mean Score												**3.82**

Result: The score for this course is **3.82** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I: PHYSICAL EDUCATION

Definition, need, scope, aims and objectives of physical education. **(24 hours)**

UNIT II: GAMES AND ATHLETEIC EVENTS

History of Games: Basketball, Volley Ball, Kho-Kho, Kabaddi, Badminton and Ball Badminton - Rules and regulation of the Games and Athletic Events. **(24 hours)**

UNIT III: NUTRITION

Balanced Diet, Daily Energy Requirement, Nutrient Balance, Nutrition Intake, Diet and Competition, Nutritional Tips, Your Ideal Weight. **(24 hours)**

UNIT IV: HEALTH EDUCATION

Meaning of health education, Definition of health education, Personal Hygiene, Communicable Diseases **(24 hours)**

UNIT V: FIRST AID

First Aid: Injuries to bones and Muscles, Sprain, Strain, Muscle Cramp and joints Dislocation and Fractures Snake-bite, Dog bite Poisoning, Artificial Respiration, (Drowning) **(24 hours)**

BOOKS FOR REFERENCE:

1. Sathyanesan, R.C., 'Hand Broken Physical Education, 'Gheena Publishers, Madurai.
2. Thirunarayanan,C and Hariharan,s, 'Analytical History of physical Education 'South India Press, Karaikudi.
3. St. John Ambulance Association, 'First Aid to the Injured' New Delhi.
4. Prabhakar Eric, (1995), 'The way to Atheletic Gold', Affliated East West Pvt. Ltd., New Delhi.

SCHEME OF EVALUATION

1.	Summative Examination (2 hours)	:	25 marks
2.	Continuous Internal Assessment	:	75 marks
	Total	**:**	**100 marks**

SCHEME OF EVALUATION FOR COTINUOUS INTERNAL ASSESSMENT

1.	Attendance (240 hrs)			:	20 marks
	❖ Theory Class	:	120 hrs		
	❖ Games	:	60 hrs		
	❖ Field Work	:	60 hrs		
2.	Performance in any one Game			:	10 marks
3.	Performance in any one of Athletic event			:	10 marks
4.	Performance in Yoga / Rhythmic activities			:	10 marks
5.	Rhythmic activities				10 marks
6.	Field Work			:	15 marks
	Total			**:**	**60 marks**

QUESTION PATTERN FOR SUMMATIVE EXAMINATION

Total marks: 25 **Time: 1 $^{1/2}$ hours**

SECTION - A

Answer All Questions (5x1=5)

(Choose the best Answer)

SECTION - B

Answer any two questions (2x2=4)

(Four question out of four)

SECTION - C

Answer any Two out of Four questions (2x5=10)

(Four question out of Four)

SECTION - D

Answer any one question (1x6=6)

(One question out of two)

CONSUMER AWARENESS

PROGRAMME OUTCOMES (PO)

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario.
2.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
3.	Express the cultural and environmental diversity that they have been exposed in various studies.
4.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
5.	Develop higher-order thinking, problem solving and self-direction skills through effective use of technologies and other resources.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities.

PROGRAM SPECIFIC OUTCOME (PSO)

PSO	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO - 1	Aware of Consumer's rights, responsibilities and Consumer Protection Act, 1986.	PO - 1
PSO - 2	Instill right-consciousness, confidence to question violations of citizen and consumer rights and fight for justice.	PO - 1, PO - 4, PO - 6
PSO - 3	Work with other voluntary consumer organizations to enhance consumer movement in the society.	PO -3, PO - 6
PSO - 4	Make informed purchase decision as individual and inculcating the behavior in others also.	PO -3, PO - 4, PO - 6
PSO - 5	Gain practical knowledge and become good consumer as well as entrepreneur.	PO -4, PO - 5, PO - 6

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	Aware of the Nature, Rights and Responsibilities of Consumer.	PO - 1	K
CO-2	Familiar with Food Trade Mark and Certification.	PO - 1, PO - 4, PO - 6	AN
CO-3	Identify Misleading Advertisement, Consumer Court and Consumer Redressal.	PO - 3, PO - 6	AP
CO-4	Acquire Knowledge in Food Adulteration and Eco friendly products.	PO - 3, PO - 4, PO - 6	K
CO-5	Attain Practical Experience through Field Visit and Interact with Experts.	PO - 4, PO - 5, PO - 6	S

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I - IV				**CONSUMER AWARENESS - I & II**								**Hours:120**
Code : 20STPCC01												**Credits: 2***
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO-1	5	5	4	5	4	3	3	4	5	4	5	4.27
CO-2	4	4	5	4	5	3	5	5	4	5	3	4.27
CO-3	5	5	4	5	4	5	3	4	5	4	5	4.45
CO-4	4	4	5	4	5	3	5	5	4	5	3	4.27
CO-5	5	4	5	4	5	3	5	4	5	4	5	4.45
Overall Mean Score												**4.34**

Result: The score for this course is **4.34** (Very High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

CONSUMER AWARENESS - I

Semester: I & II **Hours: 60**

Code : 20STPCC01

UNIT I

Consumer - Meaning - Consumerism - Nature of Consumerism, Rights and Responsibilities of Consumer - Right of Consumers under Consumer Protection Act 1986 - Do's and Dont's of Consumer.

UNIT II

Trade Mark - Definition - Meaning - Objectives -Types of Trademark in India - Process and functions of Registrar of Trade marks - Trade and Merchandise rules - Food Label Symbol, ISI, ISO, Agmark, Silkmark Certification.

UNIT III

Advertisement meaning - Features of Advertisement - Misleading Advertisement - circumstances of misleading advertisements -Reasons for Festival offer and discount.

UNIT IV

Food Adulteration - Meaning - Types of Food Adulteration - Method of Food Adulteration - How can Adulteration be prevented - How to Identify fake and Duplicate Beauty Products - Sub Standard Products.

UNIT V

Practical Session: Interacting with Experts, Field Visit

COURSE BOOK:

Material prepared by the Consumer Club

BOOKS FOR REFERENCE:

1. Dr. L. Natarajan, Business Legislation, Merit India Publication, 2017.

CONSUMER AWARENESS - II

Semester: III & IV **Hours: 60**

Code : 20STPCC01 **Credit: 2***

UNIT I

Guarantee Vs. Warrantee - Standards of Weight - Meaning - Importance of Standards - Responsible to Certify the Accuracy of Weight and Measures - Food Quality Control Procedures - Vegetarian and Non-Vegetarian Symbol.

UNIT II

Consumer Redressd Consumer Disputes - Consumer Movement - Consumer Court - Do's and Don'ts of Consumers Grievances Redressal - How to Files Complaints in Consumer Court.

UNIT III

Online Consumer- Meaning- Types of Online Consumers- Rights of Online Consumers.

UNIT IV

Eco Friendly Consumer Products - Green Consumerism- Important Steps of Green Consumerism.

UNIT V

Practical Session: Interacting with Experts, Field Visit.

COURSE BOOK:

Material prepared by the Consumer Club

BOOKS FOR REFERENCE:

1. Dr. L. Natarajan, Business Legislation, Merit India Publication, 2017.
2. Consumer Movements, Francesca Forno
3. Helping People and Communities Become and Remain Economically
4. www.insightcced.org
5. https://www.researchgate.net/publication/334126464

SCHEME OF EVALUATION

1.	Summative Examination (3 hours)	:	75 marks
2.	Continuous Internal Assessment	:	25 marks
	Total	**:**	**100 marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	*Attendance - 120 hours*	*10 Marks*
2.	*Field Visit*	*10 Marks*
3.	*Assignment*	*5 Marks*
Total		***25 Marks***

QUESTION PATTERN FOR SUMMATIVE EXAMINATION

Total Marks: 75 **Time: 3 hours**

EXTERNAL QUESTION PATTERN

PART - A

10 Questions × 1Mark = 10 Marks

(Multiple Choice Questions)

PART - B

5 Questions × 5 Marks = 25 Marks

Answer All Questions

(Either Or Questions)

PART - C

4 Questions × 10 Marks = 40 Marks

Answer Any Four Questions

(Four Questions Out of Six)

RED RIBBON CLUB

Semester: I, II, III & IV **Hours: 120**

Code : 20STPRR01 **Credits: 2***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Analyze the Objectives of Red Ribbon Club	PSO - 3, PSO - 5	K, A, E
CO - 2	Examine the need of Blood Identification	PSO - 3, PSO - 4 , PSO - 5	K, A, E
CO - 3	Understand the importance of Blood Donation	PSO - 3, PSO - 5	K, C, A, E
CO - 4	Recognise the importance of HIV Awareness	PSO - 3, PSO - 5	A, AP
CO - 5	Able to realize the need of field visit to AIDS centres	PSO - 1,PSO - 3 , PSO - 5	K, AP, S, E

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I, II, III & IV				**RED RIBBON CLUB**							**Hours: 120**
Code : 20STPRR01											**Credits: 2***
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	4	4	4	5	4	3	5	4	4	4.09
CO - 2	4	3	4	5	4	5	3	3	5	4	4	4.00
CO - 3	4	3	4	5	4	5	3	3	5	3	4	3.90
CO - 4	4	3	4	5	4	5	3	3	5	3	4	3.90
CO - 5	4	3	4	5	4	5	3	3	5	4	4	4.00
Overall Mean Score												**3.98**

Result: The score for this course is **3.98** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I

Red Ribbon Club - Meaning -Vision - Objective - Popular colour - Symbol - Significance **(25 Hours)**

UNIT II

Blood Identification - Blood composition - Blood types - Methods for the identification of blood - Microscopic examination - Chemical methods - Spectrophoto - Metric Analysis - Immunological Methods - DNA analysis - Application of blood identification **(25 Hours)**

UNIT III

Blood Donation - Introduction - Benefits - Procedure - Importance of Blood Donation - Donors - Non-Donors - Donate Blood - Donation Process: Blood Banks - Outdoor camps - Registration - Medical Checkup - Donation - Refreshment **(25 Hours)**

UNIT IV

HIV Awareness**:** Definition - Causes - Effects**:** HIV Transmission - HIV Prevention - HIV Testing - Living with HIV - HIV Stigma **(25 Hours)**

UNIT V

Blood Donation Camp - Practical and Field Work: Blood Identification Camp - HIV AIDS Awareness Programme - Field visit to Jeevan Jothi - Aundipatti Government Hospital **(30 Hours)**

COURSE BOOKS:

- Books offered by Red Ribbon Club Committee Members

BOOKS FOR REFERENCE

1. S. Kartikeyan, R.N. Bharmal, R.P. Tiwari and P.S. Bisen. HIV and AIDS: Basic Elements and Priorities. Springer Publications. 2007.

"Everytwosecondssomeone NeedsbloodRedCrossurgesblooddonations." Http://www.redcross.org/news/article/il/chicago/Everytwosecondssomeone NeedsbloodRedCrossurgesblooddonations. Red Cross, n.d.

SCHEME OF EVALUATION

1.	Summative Examination (2 hours)	:	75 marks
2.	Continuous Internal Assessment	:	25 marks
	Total	**:**	**100 marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	*Test*	*15 Marks*
2.	*Field Visit*	*5 Marks*
3.	*Attendance*	*5 Marks*
Total		***25 Marks***

Total the marks of I, II, III & IV will be converted to 25 marks

Question Pattern for External Examination

Total Marks: 75 **Time: 2 hours**

Section - A

Answer All Questions 10 x 1 = 10 Marks

(Multiple Choice Questions)

Section - B

Answer All Questions 5 x 5 =25 Marks

(Either Or Questions)

Section - C

Answer Any Two Questions 2 x 20 = 40 Marks

(Two Questions Out of Three)

YOUTH RED CROSS
PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario.
2.	Formulate hypothesis, design experiments, use appropriate tools and interpret the results.
3.	Demonstrate the precise understanding of the principles and theories of their discipline through experiments.
4.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
5.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO - 1	Student will get a basic understanding of the origin, growth and development of humanity.	PSO - 1
PSO - 2	Will acquire basic knowledge about social subjects	PSO - 1, PSO - 2
PSO - 3	Could identify various social issues and problems	PSO - 3, PSO - 4
PSO - 4	Will help to build up a good career.	PSO - 1, PSO - 4
PSO - 5	Makes them aware of social responsibilities.	PSO - 1, PSO - 5

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Understand themselves in relation to their community.	PSO - 1	K
CO - 2	Identify the needs and problems of the community and involve them in problem-solving.	PSO - 2	C
CO - 3	Gain skills in mobilising community participation. Develop capacity to meet emergencies and social harmony.	PSO - 3	C
CO - 4	Educate and empower children and youth in the spirit of the Red Cross through constructive trainings and effective leadership	PSO - 4	AN
CO - 5	Provide opportunities for directing and harnessing their energies and idealism into worthwhile humanitarian activities	PSO - 5	AN

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I - IV							**YOUTH RED CROSS**					**Hours: 120**
Code : 20STPRC01												**Credits: 2***
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	5	4	3	2	2	5	5	3	2	2	3.45
CO - 2	5	5	4	3	2	2	5	5	4	2	2	3.55
CO - 3	5	4	4	3	4	2	5	5	5	3	3	3.91
CO - 4	5	4	5	4	3	3	5	5	5	3	3	4.09
CO - 5	5	4	5	4	3	3	5	5	5	3	3	4.09
Overall Mean Score												**3.82**

Result: The score for this course is **3.82** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

BASICS OF YOUTH RED CROSS

Semester: I & II **Hours: 60**

Code: 20STPRC01

UNIT I

History of Red Cross - Henri Dunant's Early Life - The Battle of Solferino - The Man in White -The birth of Red cross - Charity in the Midst of Battle. Clara Barton: Pioneer of Disaster Relief - Death of Dunant.

UNIT II

Idea of the Red Cross Movement - Foundation of the Red Cross Movement - A Global Movement - The Emblems - History of the Emblems - Who can use the emblem in India?- Misuse of the Emblem - Why respect the Emblem?

UNIT III

The Seven Fundamental Principles - International Humanitarian Law - Re-establishing Family Links

UNIT IV

Birth of the Indian Red Cross Society - Introduction to the programmes of the IRCS - Humanitarian Values - Disaster Management - Health and Care in the Community.

UNIT V

Volunteering - Trainings

COURSE BOOK:

Material Prepared By Parent Department

BOOKS FOR REFERENCE:

1. ''The Story of the Red Cross'', Krishna Satyanand, Reprint 2002, Published by the Director, National Book Trust, India.
2. ''Basic about YRC'', Indian Red Cross Society, National Headquarters.

SIGN OF YOUTH RED CROSS

Semester: III & IV **Hours: 60**

Code: 20STPRC01 **Credits: 2***

UNIT I

The International Committee of the Red Cross (ICRC) - Origin and history - International Status - ICRC- Legal status - ICRC'S Humanitarian activities - Administration and Structure of ICRC - **National Red Cross and Red Crescent Societies**.

UNIT II

International Federation of Red Cross and Red Crescent Societies - Mission - Strength -Global Network -International Red Cross and Red Crescent movement - **Geneva Conventions and their Additional Protocols** - Protection and care - protection of persons - Protection of civilian medical and religious personnel - Methods and means of warfare - Improper use of emblems - fundamental guarantees.

UNIT III

Indian Red Cross Society - Headquarters - Resources - Partnerships - Strategic Development plan - **Indian Red Cross Society - Tamil Nadu Branch** - Indian Red Cross Society, District Red Cross Branch and Sub-Branch

UNIT IV

Youth Red Cross - Junior Red Cross

UNIT V

Field Visit

COURSE BOOK:

Material Prepared By Parent Department

BOOK FOR REFERENCE:

1. "History of Red Cross", Youth Red Cross, Indian Red Cross Society Tamil Nadu Branch

SCHEME OF EVALUATION

1.	Summative Examination (3 hours)	:	75 marks
2.	Continuous Internal Assessment	:	25 marks
	Total	**:**	**100 marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	*Attendance - 120 hours*	*10 Marks*
2.	*Field Visit*	*10 Marks*
3.	*Assignment*	*5 Marks*
Total		***25 Marks***

QUESTION PATTERN FOR SUMMATIVE EXAMINATION

Total Marks: 75 **Time: 3 hours**

EXTERNAL QUESTION PATTERN

PART - A

10 Questions × 1Mark = 10 Marks

(Multiple Choice Questions)

PART - B

5 Questions × 5 Marks = 25 Marks

Answer All Questions

(Either Or Questions)

PART - C

4 Questions × 10 Marks = 40 Marks

Answer Any Four Questions

(Four Questions Out of Six)

EXTENSION

SKILL DEVELOPMENT PROGRAMME (SDP)

IT SKILLS FOR CHEMISTS

U.G. PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario.
2.	Formulate hypothesis, design experiments, use appropriate tools and interpret the results.
3.	Demonstrate the precise understanding of the principles and theories of their discipline through experiments.
4.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
5.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities such as self-esteem, positive attitude, self-discipline, and self-motivation.

U.G. PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Apply knowledge in various aspects of chemistry in fields such as organic, inorganic, physical, analytical, spectral, biochemical and environment	PO-1, PO-2
2.	Exhibit problem solving skills and analytical skills	PO-2, PO-3
3.	Realize the values of chemistry in our daily life and discharge knowledge and skills as analyst in small scale industries, cottage industries and quality control sectors	PO-5, PO-6
4.	Pursue higher education in the field of chemistry and in different horizon of life	PO-4, PO-5
5.	Fix their feet and brighten their career in the field of chemistry for sustainable future and face emerging opportunities and challenges	PO-1, PO-4, PO-6

SKILL DEVELOPMENT PROGRAMME (SDP)

IT SKILLS FOR CHEMISTS

Semester: Non Semester **Hours: 2**

Code : 20CH1SD01 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	Draw chemical structures with chem draw tools	PSO-2	K, Ap
CO-2	Apply the knowledge of chem draw in report writing	PSO-3	Ap, An
CO-3	Equip the skills in origin software	PSO-3	Ap, An
CO-4	Interpret spectral data using origin software	PSO-5	Ap, An, S
CO-5	Gain knowledge on the informatics methods to solve chemical problems	PSO-2,3	K, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: Non Semester				**IT SKILLS FOR CHEMISTS**							**Hours: 2**
Code : 20CH1SD01											**Credits: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	2	3	3	4	3	4	5	3	4	5	3.63
CO - 2	4	3	5	4	3	4	5	4	4	3	4	3.90
CO - 3	3	4	4	5	3	2	4	3	5	3	4	3.63
CO - 4	4	3	5	4	2	3	5	3	4	3	5	3.72
CO - 5	4	3	4	5	3	3	5	4	3	4	5	3.90
Overall Mean Score												**3.74**

Result: The Score for this Course is 3.74 (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

UNIT I: CHEM DRAWI:

Introduction - definition - modes - main tools - analysis window - chemical properties window - panels in drawing - chemical structures - drawing tools and objects - templates - conversion of name to structure and vice versa

(12 Hours)

UNIT II: CHEM DRAWII:

Significance of chem draw - role of chem draw in chemistry - chem sketch practices: benzene, DDT, BHC, glucose, sucrose, enantiomers, 18- annulene - writing equations - chem sketch - 3D - drawing chemical structure - pasting them in text - saving files as images **(12 Hours)**

UNIT III: ORIGIN:

Introduction - file: new - open - save project - edit: copy - paste - import: single ASCII - graphical plot : line, symbol, line+symbol - column bars - multicurve - export graph - windows: workbook **(12 Hours)**

UNIT IV: DATA ANALYSIS USING ORIGIN:

Format menu - analysis - linear and non linear graphs - UV - Visible spectral data - FT-IR spectral data- fitting linear graph for first order rate constant: ester hydrolysis - fitting non-linear graph for conductometric titrations **(12 Hours)**

UNIT V: CHEMINFORMATICS

Cheminformatics: History, Representing molecules: older systems - connection tables, line notation - Inchi, SMILES, WLN canonicalization. Line notation versus connection tables. Query languages - SMARTS. Nomenclature: IUPAC names, trade names, common names. Molecular similarity: Ways to measure similarity - 2D topology, 3D configuration, Physical properties, clustering. Chemical registration system Chemistry softwares **(12 Hours)**

BOOKS FOR REFERENCE:

1. Polanski, J. (2009). Chemoinformatics. Poland: Elsevier Publications.
2. Chem draw Ultra 12.0 and OriginPro 9.0

SKILL DEVELOPMENT PROGRAMME (SDP)

IT SKILLS FOR CHEMISTS

TESTING AND EVALUATION OF CERTIFICATE COURSE

DISTRIBUTION OF MARKS

Internal	External	Total
25	75	100

The components for internal and external exams are at the discretion of the department.

CIA Components (Internal)

Component		Marks
Test - I	:	30
Test - II	:	30
Assignment	:	10
Quiz/Seminar	:	10
Practical Test	:	20
Total	**:**	**100**

The total internal marks obtained for 100 will be converted into marks obtained for 25

Question Pattern (Internal exam)

Time: 2 Hours **Maximum: 30 Marks**

PART - A

Answer **all** the Questions. (5×2=10)

PART - B

Answer **all** the Questions (Either or Choice) (2×5=10)

PART - C

Answer **ANY ONE** out of TWO Questions (1×10=10)

QUESTION PATTERN (Blue Print of External Question Paper)

(External at the end of II semester)

Time: 3 hours **Max. Marks: 75**

PART	Types of Question	Number of Qns.	Number of Qns. to be answered	Marks for each Qn.	Total
A Q. No (1-10)	Two questions from each unit	10	10	2	**20**
B Q. No (11-15)	either / or type. - one question from each unit	5	5	5	**25**
C Q. No (16-20)	Open choice - One question from each unit	5	3	10	**30**

SKILL DEVELOPMENT PROGRAMME (CERTIFICATE COURSE)

GANDHIAN THOUGHT

PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario.
2.	Formulate hypothesis, design experiments, use appropriate tools and interpret the results.
3.	Demonstrate the precise understanding of the principles and theories of their discipline through experiments.
4.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
5.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities such as self-esteem, positive attitude, self-discipline and self-motivation.

PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO - 1	Analyse the social, political, economic, cultural and religious conditions of the various dynasties of India, British India, Indian Constitution, Indian Administration and Indian Economy to acquire the special skill in the field of administration.	PO- 1, PO-2, PO-4
PSO - 2	Evaluate the History of World Civilizations and Europe in the world politics and compare the various types of constitution and the constitutional development in England.	PO- 1, PO-2
PSO - 3	Get knowledge on the principles of Economics, functions of banking system, development of Science and Technology, Tourism, the importance of Human Rights and equip with computer knowledge and applications for all competitive examinations.	PO- 1, PO-4, PO-5
PSO - 4	Recognize the sacrifice of the freedom fighters in the National Movement and picturize the traditional values in the right perception on Women Studies and Women Entrepreneurship.	PO- 1, PO- 5, PO- 6
PSO - 5	Participate in discussions by listening to others perspectives, asking productive questions, articulating original ideas, correspond efficiently with good vocabulary, realize the need of historical research and excel in General Studies for Competitive Examinations.	PO- 2, PO- 5, PO- 6

PAPER I: LIFE OF MAHATMA GANDHI - CCHYGT01

Code: CCHYGT01 **Hours: 1**
Credit: 1

COURSE OUTCOMES:

CO. NO	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO- 1	Gain Knowledge on the Early Life of Mahatma Gandhi	PSO - 5	K
CO-2	Analyse the racial equality and Mahatma Gandhi's Experience in South Africa	PSO - 5	An
CO-3	Explain the role of Mahatma Gandhi in Indian Freedom Struggle	PSO - 2	Ap
CO-4	Assess the constructive works of Mahatma Gandhi in Indian Nationalism	PSO - 2	Ap
CO-5	Discuss the major Incidents from the Life of Mahatma Gandhi	PSO - 5	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

	PAPER I: LIFE OF MAHATMA GANDHI - CCHYGT01											Hours: 1
Code: CCHYGT01												Credits: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 2	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 3	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 4	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 5	5	5	5	5	5	5	4	5	4	3	3	4.45
Overall Mean Score												4.45

Result: The score for this course is High

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I

Family background and beginnings of the Mahatma - Birth and childhood - Education and family life - lessons learned - The London Experience

UNIT II

Making of the Mahatma: Gandhi in South Africa - From a barrister to a people's leader - Towards racial equality - From family life to ashram life - Birth of Satyagraha and constructive work - experiments with truth

UNIT III

Beginnings of Indian Freedom Struggle: Early resistances and 1857 Revolt - Birth of Indian National Congress: Moderates, Extremists and Terrorists - Gandhi leads the nation in a new direction - Early micro satyagrahas

UNIT IV

Mahatma Gandhi leads the Freedom struggle to victory: Major satyagrahas - Constructive Work - Sabarmathi and Sevagram - Various currents of Indian Nationalism - Towards partition and freedom - The final martyrdom

UNIT V

Video shows on Gandhi - Field and life experiences - Incidents from the life of Gandhi that inspired and shaped your life.

PAPER II: NON VIOLENCE AND SARVODAYA - CCHYGT02

Code: CCHYGT02 **Hours: 1**

Credit: 1

COURSE OUTCOMES:

CO. NO	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO- 1	Gain Knowledge on Mahatma Gandhi's Non - violence	PSO - 5	As
CO-2	Discuss the Policies of Mahatma Gandhi on Truth and Action	PSO - 5	An
CO-3	Analyse Sarvodaya and Antyodaya	PSO - 5	K
CO-4	Assess the values introduced through Brahmacharya and Aparigraha	PSO - 5	Ap
CO-5	Relate violence and Truth in our day today life with the teachings of Gandhiji	PSO - 2	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Code: CCHYGT02	PAPER II: NON VIOLENCE AND SARVODAYA - CCHYGT02										Hours: 1 Credits: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 2	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 3	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 4	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 5	5	5	5	5	5	5	4	5	4	3	3	4.45
Overall Mean Score												**4.45**

Result: The score for this course is High

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I

Meaning of Nonviolence (*ahimsa*): Nonkilling and noninjuring - Love, service and forgiving - Nonviolent Action: Peaceful resolution of conflict, nonviolent life style & constructive work and Satyagraha - Nonviolent values and ethics

UNIT II

Truth: Absolute and Relative - Moving beyond falsehood, errors and mistakes - Truth and pluralism - Truth and action - Truth and Nonviolence

UNIT III

Sarvodaya (welfare of all at all levels) and Antyodaya (welfare of the last first) - Means and Ends - Removal of untouchability - Communal Harmony - Uplift of Women

UNIT IV

Removal of poverty: Full & total appropriate employment - Self-dependence, Self - reliance, Swaraj and Swadeshi (love thy neighbour) - Self-control and Sublimation (*brahmacharya*) - Simple and Ethical living - *Aparigraha* (nonpossession) and Trusteeship (stewardship) - Appropriate and Holistic Science and Technology.

UNIT V

Place of Nonviolence and truth in our day to-day life and ways to enhance them - learn and practice three skills which would enhance your self-reliance and ability to help (serve) others in need - Resolve conflicts peacefully - Experience inter-religious relationships, dialogue and prayers.

RECOMMENDED BOOKS

PAPER I

Mahatma Gandhi	:	An Autobiography சத்திய சோதனை
R. Nanda	:	Mahatma Gandhi - A Biography
டி.டி. திருமலை	:	காந்தி
கல்கி	:	மாந்தருள் ஒரு தெய்வம்
திரு.வி.க.	:	காந்தியடிகளும் மனித வாழ்க்கையும்
ஜெயகாந்தன்	:	வாழ்விக்க வந்த காந்தி
J.B. Kriplani	:	Gandhi His Life and Thought
லூயி பிஷர்	:	மகாத்மா காந்தி
Louis Fischer	:	The Life of Mahatma Gandhi
பா. ஆனந்தி, மங்களவதி கேப்ரியல் & வி.ஏ. வித்யா	:	காந்திய சிந்தனை வினா-விடை (Gandhian Thought Quiz)
சி. பெரிதாய் & பா. ஆனந்தி	:	மகாத்மா காந்தியடிகளின் காலம்

PAPER II

M.K. Gandhi	:	Sarvodaya
————	:	Nonviolence in Peace and War (2 Vols)
————	:	Truth is God
Richard B. Gregg	:	Power of Nonviolence
மு. வசந்தா (பதி.)	:	சர்வோதயம்
R.R. Diwakar	:	The Saga of Satyagraha
ச. செயப்பிரகாசம்	:	அகிம்சை

COURSE BOOK:

மகாத்மா காந்தியின் வாழ்வும் அறவியலும் - டாக்டர் பா. ஆனந்தி & டாக்டர் ச. செயப்பிரகாசம்

Life and Values of Mahatma Gandhi - Dr. B. Ananthi & Dr. S. Jeyapragasam

தாள் I - மகாத்மா காந்தியின் வாழ்வு - CCHYGT01

Code: CCHYGT01 **Hours: 1**

Credit: 1

COURSE OUTCOMES:

CO. NO	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO- 1	Gain Knowledge on the Early Life of Mahatma Gandhi	PSO - 5	K
CO-2	Analyse the racial equality and Mahatma Gandhi's Experience in South Africa	PSO - 5	An
CO-3	Explain the role of Mahatma Gandhi in Indian Freedom Struggle	PSO - 2	Ap
CO-4	Assess the constructive works of Mahatma Gandhi in Indian Nationalism	PSO - 2	Ap
CO-5	Discuss the major Incidents from the Life of Mahatma Gandhi	PSO - 5	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Code: CCHYGT01				தாள் I - மகாத்மா காந்தியின் வாழ்வு - CCHYGT01								Hours: 1 Credits: 1
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 2	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 3	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 4	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 5	5	5	5	5	5	5	4	5	4	3	3	4.45
Overall Mean Score												**4.45**

Result: The score for this course is High

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

அலகு 1

குடும்ப பின்னணியும் மகாத்மாவின் தொடக்கமும் - பிறப்பும் குழந்தைப் பருவமும் - கல்வியும் குடும்ப வாழ்வும் - கற்ற பாடங்கள் - இலண்டன் அனுபவங்கள்.

அலகு 2

மகாத்மா உருவாகிறார் - தென்னாப்பிரிக்காவில் காந்தி - பாரிஸ்டரிலிருந்து மக்கள் தலைவராக - இன சமத்துவத்தை நோக்கி - குடும்ப வாழ்விலிருந்து ஆசிரம வாழ்வுக்கு - சத்தியாகிரகம் மற்றும் தீர்மானப்பணியின் தொடக்கம் - சத்திய பரிசோதனைகள்.

அலகு 3

இந்திய விடுதலைப் போராட்டத்தின் தொடக்கம் - ஆரம்ப கால எதிர்ப்புகளும் 1857 எழுச்சியும் - இந்திய தேசிய காங்கிரசின் தொடக்கம் - மிதவாதிகள், தீவிரவாதிகள் மற்றும் பயங்கரவாதிகள் - காந்தி நாட்டை புதிய திசையில் நடத்துகிறார் - ஆரம்ப வட்டார சத்தியாகிரங்கள்.

அலகு 4

மகாத்மா காந்தி இந்திய விடுதலைப் போராட்டத்தை தலைமையேற்று நடத்துகிறார் - தேசிய சத்தியாகிரங்கள் - நிர்மாணப் பணிகள் - சபர்மதியும் சேவாகிராமும் - இந்திய தேசியத்தின் பல்வேறு போக்குகள் - பிரிவினையும் விடுதலையும் - மகத்தான உயிர் தியாகம்.

அலகு 5

காந்தியைப் பற்றிய படங்கள் - கள மற்றும் வாழ்க்கை அனுபவங்கள் - உங்களது வாழ்வை பரவசப்படுத்திய, உருக்கிய மகாத்மா காந்தியின் வாழ்க்கை நிகழ்ச்சிகள்.

தாள் **II** - அகிம்சையும் சர்வோதயமும் - **CCHYGT02**

Code: CCHYGT02 **Hours: 1**

Credit: 1

COURSE OUTCOMES:

CO. NO	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO- 1	Gain Knowledge on Mahatma Gandhi's Non - violence	PSO - 5	As
CO-2	Discuss the Policies of Mahatma Gandhi on Truth and Action	PSO - 5	An
CO-3	Analyse Sarvodaya and Antyodaya	PSO - 5	K
CO-4	Assess the values introduced through Brahmacharya and Aparigraha	PSO - 5	Ap
CO-5	Relate violence and Truth in our day today life with the teachings of Gandhiji	PSO - 2	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Code: CCHYGT02				தாள் **II** - அகிம்சையும் சர்வோதயமும் - **CCHYGT02**							**Hours: 1** **Credits: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 2	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 3	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 4	5	5	5	5	5	5	4	5	4	3	3	4.45
CO - 5	5	5	5	5	5	5	4	5	4	3	3	4.45
Overall Mean Score												**4.45**

Result: The score for this course is High

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of Pos \& PSOs}}$	Mean Overall Score for Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

அலகு 1

அகிம்சையின் பொருள் - கொல்லாமையும் துன்பம் செய்யாமையும் - அன்பு, தொண்டு மற்றும் மன்னித்தல் - அகிம்சைச் செயல்- அமைதி வழியில் சிக்கல் தீர்வு, அகிம்சை வாழ்வியலும் நிர்மாணப்பணியும், சத்தியாகிரகம் - அகிம்சை அறவியலும் விழுமியங்களும்.

அலகு 2

உண்மை : பேருண்மையும் (முழுமை உண்மையும்) சார்பு உண்மையும்- பொய்மைகள், தவறுகள் மற்றும் குற்றங்களுக்கு அப்பால் செல்லுதல் - உண்மையும் பன்மியமம் - உண்மையும் செயலும் - உண்மையும் அகிம்சையும்.

அலகு 3

சர்வோதயமும் (அனைவரின் நலம் அனைத்து நிலைகளிலும்) அந்தியோதயமும் (கடையவர் நலன் முதலில்) - குறிக்கோளும் வழிமுறையும் - தீண்டாமை நீக்கம் - சமூக ஒற்றுமை - மகளிர் முன்னேற்றம்.

அலகு 4

வறுமை நீக்கம் : முழுமையான ஏற்புடைய வேலை வாய்ப்பு - தற்சார்பும் தன்னிறைவும், சுயராஜ்ஜியம் மற்றும் சுதேசி (அயலவரை நேசி) - புலனடக்கமும் மேன்மையாக்கமும் (பிரம்மச்சரியம்) - எளிய மற்றும் அறவியல் வாழ்வு உடைமையின்மையும், அறங்காவலர் நெறியும் - ஏற்புடைய மற்றும் முழுமை அறிவியலும் தொழில் நுட்பமும்.

அலகு 5

நமது அன்றாட வாழ்வில் அகிம்சையும் உண்மையும் பெறுமிடமும் அதனை மேம்படுத்தும் வழிகளும் - உங்களது தற்சார்பையும் தேவையில் பிறருக்கு உதவும் ஆற்றலையும் வளர்க்கும் ஏதாவது மூன்று திறன்களைக் **(Skills)** கற்றல் - அமைதி வழியில் சிக்கல் தீர்வு அனுபவங்கள் - சர்வசமய நட்புறவு, உரையாடல் மற்றும் வழிபாட்டு அனுபவம் பெறல்.

SKILL DEVELOPMENT PROGRAMME (SDP)

LIBRARY AND INFORMATION SCIENCE

THEORY PAPER & PRACTICAL

PROGRAMME OUTCOMES (PO)

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the expertise of their discipline worldwide.
2.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
3.	Express the cultural and environmental diversity that they have been exposed in various studies.
4.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
5.	Develop higher-order thinking, problem solving and self-direction skills through effective use of technologies and other resources.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities.

THEORY PAPER & PRACTICAL

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Have knowledge about the Library Resources and Services.	PO-2, PO-5
2.	To get Equipped with capabilities required for placement in Libraries	PO-2, PO-5
3.	To Use maximum of resources available in the Library.	PO-1
4.	Get the basic practical approaches to use online resources.	PO-5, PO-6
5.	Familiarize with the Principles of Management in Library Services.	PO-4

OBJECTIVES:

- To familiarize the students with the methods of maintaining Library Resources and Services.
- To equip them with capabilities required for placement in Libraries.

TEACHING HOURS

The Certificate course will be conducted in 60 contact hours per year as follows

Theory = 30 Hours
Practical = 30 Hours

ELIGIBILITY

Any III U.G. and any P.G. Student

SYLLABUS
THEORY PAPER

Code: 20GL1SD01 **Hours: 2**

Credit: 1

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Have knowledge about the various types of Libraries.	PSO - 1	K
CO - 2	Understand the various kinds of Reference sources available in the Library	PSO - 1	C
CO - 3	Get the analytical approaches to classify and Arrange the reading materials in Library	PSO - 2	An
CO - 4	Apply various methods to search the reading material and thereby get it at the earliest	PSO - 3	Ap
CO - 5	To Acquire knowledge about the managerial principles and techniques in Libraries.	PSO - 5	K

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Code: 20GL1SD01				THEORY PAPER							Hours: 2 Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	3	4	4	4	4	4	3	4	4	4	4	3.82
CO - 2	4	4	4	4	4	4	4	4	4	4	4	4
CO - 3	3	3	4	4	4	3	3	4	4	3	3	3.45
CO - 4	4	4	4	4	4	4	4	4	4	4	4	4
CO - 5	4	4	4	3	3	3	3	3	4	4	4	3.55
Overall Mean Score												**3.76**

Result: The score for this course is **3.76** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

UNIT I: LIBRARY AND SOCIETY

Five Laws of Library Science - Extension services - Types of Library - Orientation to Library Staff and Students

UNIT II: INFORMATION SOURCES & SERVICES

Information - Reference Service, Definition, Kinds - Kinds of Sources of Information - Standard Ready Reference Sources - Bibliography - Definition, Types - Abstract: APA style.

UNIT III: CLASSIFICATION THEORY

Library classification - Definition, need and purposes - Colon Classification 6th Edition and Dewey Decimal Classification 20th Edition : General features.

UNIT IV: CATALOGUING THEORY

Definition, objectives and functions of catalogue - Physical and inner forms of catalogue - OPAC

UNIT V: LIBRARY MANAGEMENT

Principles of Management - Library Rules - Library routines (Selection, Acquisition, Technical processing) - Circulation Systems(Charging & Discharging), Automated charging system - Preservation of reading materials

UNIT VI: INFORMATION TECHNOLOGY

Computer application to Library work - Internet: General features, Search engines -e-resources - E-Library / Digital Library - INFLIBNET N-List, SHODHSINDH

PRACTICAL PAPER

Code: 20GL1SDP1 **Hours: 2**

Credit: 1

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Apply colon classification scheme in classifying the reading materials.	PSO - 2	Ap
CO - 2	Analyse the title according to Dewey Decimal Classification Scheme.	PSO - 2	An
CO - 3	Synthesis code for the book title according to colon Classification.	PSO - 5	S
CO - 4	Apply code for the book title according to Dewey Decimal Classification.	PSO - 2	Ap
CO - 5	Get practical approaches to search and download online resources.	PSO- 2	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Code: 20GL1SDP1				**PRACTICAL PAPER**							**Hours: 2** **Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	3	4	4	4	4	3	4	4	4	3	3.64
CO - 2	4	3	4	4	4	4	4	4	3	4	4	3.82
CO - 3	4	4	4	4	4	3	3	4	4	3	3	3.64
CO - 4	3	4	4	4	4	4	4	4	4	4	4	3.91
CO - 5	3	4	4	3	3	3	3	3	4	4	4	3.45
Overall Mean Score												**3.69**

Result: The score for this course is **3.69** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos= Total of Mean Scores / Total No. of Cos

Colon Classification -6th edition, Main Classes

1. Dewey Decimal Classification 20th edition - I, II & III Summary
2. Computer - Internet searching and to download information
3. INFLIBNET N-List - Searching process

BOOKS FOR REFERENCE:

1. Library Organisation and Decision Making - J. B.Sharma - Pointer Publishers, Jaipur - 2008
2. Library and Information Science - C.K. Sharma, Akhil Kumar Singh and Rakesh Kumar- Atlantic publishers & distributors (P) Ltd. - 2008
3. Reference Service - Mr. Krishan Kumar
4. Basics of Library and Information Science - K.T.Dilli, Vikas Publishing.
5. Preservation of Library, Archival and Digital Documents - L.S.Ramaiah & G. Sujatha - ESS ESS Publications, New Delhi - 2008
6. E-Libraries in Computer age - C.Praveen S ingh - Alfa publications, New Delhi - 2008
7. Colon Classification - S.R.Ranganathan - 6th Edition - Asia publishing house, New Delhi - 1960
8. Dewey Decimal Classification - Edited by John P Comaromi etc. - 20th Edition - Forest press, New York - 1989

EVALUATION METHOD

Theory Paper Code : 20GL1SD01		Practical Paper Code : 20GL1SDP1	
Internal	25 Marks	Internal	50 Marks
External	75 Marks	External	50 Marks
Total	**100 Marks**	**Total**	**100 Marks**

QUESTION PATTERN

THEORY PAPER - EXTERNAL QUESTION PATTERN - 75 MARKS

Part - A

Multiple Choice Questions 1 × 10 = 10 Marks

From all units

Part - B

Paragraph Questions - 4 out of 6 4 × 5 = 20 Marks

From all units

Part - C

Essay in 400 words - 3 out of 6 3 × 15 = 45 Marks

From all units

DEPARTMENT OF HINDI

PART I - HINDI - COURSE PATTERN (2020 - 2023)

Part	Sem.	Code	Title of the Paper	Hours	Credits
I	I	20GH1GS01	Paper - I - Prose, Short Story and Grammar - I	5	3
	II	20GH2GS02	Paper - II - Novel, One act Play, and Grammar - II	5	3
	III	20GH3GS03	Paper - III Poetry and History of Hindi Literature, Alankar	5	3
	IV	20GH4GS04	Paper IV - General Essay, Technical Hindi, Translation, and Letter Writing	5	3
		Total		**20**	**12**

TESTING AND EVALUATION

Course	Continuous Internal Assessment	Semester Examination
Hindi	40%	60%

Continuous Internal Assessment

Continuous Assessment will be carried out by the Course Teachers. The components of CIA are as follows:

Components	Marks
Test -I	30
Test -II	30
Seminar/Quiz	10
Assignment	05
Attendance	05
Total	***80**

* The total internal marks obtained for 80 will be converted into marks obtained for 40.

HINDI - EXTERNAL QUESTION PATTERN

Time: 3 Hours **Marls: 60**

Section A: (One Word / Sentence) 10 x 1 = 10 Marks

Section B: (Paragraph / Annotation) 4 x 5 = 20 Marks

Section C: (Essay) 3x 10 = 30 Marks

PAPER I - PROSE, SHORT STORY AND GRAMMAR - I

Semester: I **Hours: 5**

Code : 20GH1GS01 **Credits: 3**

1. Prose : Naveen Hindi Patamala Part-3

Published by Dakshina Bharathi Hindi Prachar Sabha,

Thyagaraya Nagar, Chennai - 600 017.

The following Lessons have been prescribed

a) Shiraj Ki Gurubhakthi

b) Shri Krishn

c) Gupth Rupya

d) Karmaveer Kamaraj

2. Short Story : Kahani Manjari

Edited by : Dakshin Bharath Hindi Prachar Sabha,

Thyagaraya Nagar, Chennai - 600 017.

The following short stories have been priscribed

a) Badegar kee beti - Premchand

b) Thayee - Vishwamranava Shrama Kaushik

c) Paanch minute - Mohanlalji Mahato yogi

d) Usne Kaha tha - Chandra dharshama Guleri

3. Grammar 1 : Vyakaran Pradeep Published by Ramdev, Hindi Bhaan,

63, Tagore Nagarm Allahabad -2

The following topics have been prescribed

a) Noun b) Gender and Number

c) Pronoun d) Adjectives

PAPER II - NOVEL, ONE ACT PLAY AND GRAMMAR - II

Semester: II **Hours: 5**

Code : 20GH2GS02 **Credits: 3**

1. **Novel** : Nirmala (Abridged version)
   by Premchand, Hamsa Prakashan Allahabad
2. **One Act Play** : Aadarsh Ekanki
   Published by Dakshina Bharath Hindi Prachar Sabha,
   Thyagaraya Nagar, Chennai - 600 017.
   The following Ekankies have been prescribed
   a) Doosra din - Kanchanlatha sabbarval
   b) Rajpoothri Ka badla - Divjendralal Rai
3. **Grammar** : Ramdev, Published by Hindi Bhavan,
   63 Tagore Nagar, Allahabad - 2
   The following topics have been prescribed
   a) Verb
   b) Tense and Voice
   c) Adverb
   d) Prepositions
   e) Conjunctions
   f) Interjunctions

PAPER III - POETRY AND HISTORY OF HINDI LITERATURE, ALANKAR

Semester: III **Hours: 5**

Code : 20GH3GS03 **Credits: 3**

1. POETRY:

Kavya Saurab Published by Dakshina Bharatha Hindi Prachar Sabha, T. Nagar, Chennai - 600 017.

The following poems have been prescribed

1. Sachche Devtha - Ayodhya Singh Upadhyay Harioudh
2. Murjhaphool
3. Vivshtha
4. Badal - Sumitranandan Panth
5. Vasanth Aayaa
6. Deep Koi jal raha hai
7. Kabir Ke Dohe - 5 numbers
8. Tulasi Ke Dohe - 5 numbers
9. Raheem Ke Dohe - 5 numbers
10. Bihari Ke Dohe - 5 numbers

2. HISTORY OF HINDI LITERATURE:

Hindi Sahitya Ka Ithas by Rajanath Sharma Vinod Pushhak Mandir, Agra - 2

The following topics have been prescribed Salient features of Aadikl Bakthikal (Gyan marg, Premmag, Rambakthi, Krishnabakthi and Reethika.

Short Notes from Adunikkal**:** Chayavad, Pragathivad, Mythili Sharan, Gupta, Dinkar Premchand Pant Prasad, Ramachandra Shukla

3. ALANKAR:

Ras chand Alankar Chandrika Karnataka Mahila Hindi Seva Samithi, Chamarajpet, Bangalore - 560 008. The following Alankars have been prescribed Anupras, Yamak, Vakrokthi, Upama, Virodabhas.

PAPER - IV - GENERAL ESSAY, TECHNICAL HINDI, TRANSLATION AND LETTER WRITING

Semester: IV **Hours: 5**

Code : 20GH4GS04 **Credits: 3**

1. General Essay:

Nibandh Praveshika, Dakshin Bharath Hindi Prachar Sabha T.Nagar, Chennai - 600 017

The following Sahityotar (General) essay have been prescribed

a. Anushashan
b. Parishram Ka Mahatva
c. Paropkar
d. Bharat Ki Kalatmak Ekta
e. Nari Ka Karthavye Aur Adhikaar

2. Translation: Anuvad Abyas - III (1-5 Lessons) English to Hindi, Hindi to English Published by Dakshina Bharath Hindi Prachar Sabha T.Nagar, Chennai - 600 017.

3. Technical Hindi: Karyalaya Sahayika, Kendriya Sachivalaya Hindi Parishad NewDelhi, Hindi Vathayan

Dr. K. Chandra Mohan, Viswa Vidyalaya Prakashan Varanashi

Banking Terms : 50 only

Nemikaryalaya Tippani : 50 only

Name of the Ministries : 33 only

4. Letter Writing: Pramanik Alekan Aur Tippan Prof Viraj M.A. Kashmirgate, Delhi - 110 006

PaariVarik Patra, Avedan Patra, Sampathak ke naam Patra, Padhadhikariyon ke naam Patra

DIPLOMA IN MODERN COSMETICS

U.G. PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario.
2.	Formulate hypothesis, design experiments, use appropriate tools and interpret the results.
3.	Demonstrate the precise understanding of the principles and theories of their discipline through experiments.
4.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
5.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities such as self-esteem, positive attitude, self-discipline, and self-motivation.

U.G. PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Apply knowledge in various aspects of chemistry in fields such as organic, inorganic, physical, analytical, spectral, biochemical and environment	PO-1, PO-2
2.	Exhibit problem solving skills and analytical skills	PO-2, PO-3
3.	Realize the values of chemistry in our daily life and discharge knowledge and skills as analyst in small scale industries, cottage industries and quality control sectors	PO-5, PO-6
4.	Pursue higher education in the field of chemistry and in different horizon of life	PO-4, PO-5
5.	Fix their feet and brighten their career in the field of chemistry for sustainable future and face emerging opportunities and challenges	PO-1, PO-4, PO-6

DIPLOMA IN MODERN COSMETICS

Course Pattern

S. No.	Code	Title of the Course	Hours	Credits
1	DCCHMC01	Chemistry of Modern Cosmetics	2	2
2	DCCHMCP1	Practical: Handling Cosmetics Lab-I	2	1
3	DCCHMCP2	Practical: Handling Cosmetics Lab-II	2	1
			6	4
Total number of hours = 30 weeks x 6 = 180 Hours				

CHEMISTRY OF MODERN COSMETICS

Semester: Non Semester **Hours: 2**

Code : DCCHMC01 **Credits: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Discuss the chemistry of cosmetics and different modes of application	PSO - 1, PSO - 2	K, Ap
CO - 2	Aware of the chemical aspect of cosmetics	PSO - 3	E, An
CO - 3	Apply relevant theoretical perspectives to practical application	PSO - 3	Ap, An
CO - 4	Apply the indepth knowledge about the cosmetics and its applications in real life context	PSO - 4	Ap, An, S
CO - 5	Brighten their career as beautician and utilize the opportunities	PSO - 5	Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Non Semester				CHEMISTRY OF MODERN COSMETICS							Hours: 2
Code : DCCHMC01											Credits: 2
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	3	4	4	3	3	4	4	3	4	4	3	3.54
CO - 2	4	3	3	3	3	4	3	3	3	4	3	3.27
CO - 3	4	4	3	4	4	4	3	4	3	4	4	3.72
CO - 4	3	3	3	4	4	4	3	3	4	4	3	3.45
CO - 5	3	4	4	4	3	4	3	4	3	5	4	3.45
Overall Mean Score												3.48

Result: The Score for this Course is **3.48** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

UNIT I

CHEMISTRY OFCOSMETICS:

Definition- history of cosmetics - cosmetic formulation - skin care - hair care - deodorants and antiperspirants - colour cosmetics: mascara, eye shadow - eyebrow pencils - sun protection - aerosols - nail cosmetics - mouth cosmetics-perfumesandfragrances **(12 Hours)**

UNIT II

COSMETICS FOR THE SKIN-I:

Powders: Face powder: discussion of these properties - raw materials used - manufacturing methods - properties - formulae: light base with ZnO and white base with heavy powders

Creams: General considerations - classification - raw materials - cold - cleansing - all purpose creams - formulae of creams: lubricating - night- skin protective and hand creams - vanishing and foundation - liquid creams: cream oil base, finished cream formulae **(12 Hours)**

UNIT III

COSMETICS FOR THE SKIN-II:

Lotions: Classification - difference from liquid creams and gums - mucilage making - astringents, antiseptics and preservatives - clarification- hand lotions: varieties - increased uses - formulae- skin toning lotion - skin fresheners: definition and functions - formulae- medicated lotions: limitations - Deodorants: general consideration - bath and bathing preparation **(12 Hours)**

UNIT IV

COSMETICS FOR HAIR AND SHAVING MEDIA:

Shampoos: Anatomy of the hair and scalp -function - formulation - sulfonation - soapless, soap and cream shampoos. Shaving media: brushless shaving creams - raw materials - formulae - shaving soaps - shaving powder formulae - cosmetics for the nails - enamels or polishes - manicure-formulae **(12 Hours)**

UNIT V

COSMETICS FOR TEETH AND MOUTH:

Dentifrices and Mouth Washes: general consideration - importance of packages - claims - raw materials - abrasives - sweeteners - flavors - foaming agents - liquid addition - colloidal binding agents - formulae - defectsincosmetics-suggestionsforcorrection **(12 Hours)**

BOOKS FOR REFERENCE:

1. E. G. Thomssen, Modern Cosmetics, Universal publishing corporation Bombay, Reprinted in India, 1985.
2. Kirpal Singh, Chemistry in Daily Life, PHI Learning Private Limited, New Delhi, 3rd edition, 2012.

Practical: HANDLING COSMETICS LAB-I

Semester: Non semester **Hours: 2**
Code : DCCHMCP1 **Credits: 1**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on different types cosmetics	PSO - 2	K, U
CO - 2	Classify the types of manicure	PSO - 3	Ap, An
CO - 3	Equip their skills in hair cutting	PSO - 3	Ap, An
CO - 4	Focus their carrier advancement in hair dressing	PSO - 3, PSO - 5	Ap, An
CO - 5	Apply the techniques as a beautician	PSO - 5	K, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: Non Semester				Practical: HANDLING COSMETICS LAB-I							Hours: 2
Code : DCCHMCP1											Credits: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	4	4	4	5	4	3	2	3	3	4	4	3.64
CO - 2	4	3	3	3	4	4	2	3	2	4	4	3.27
CO - 3	4	5	4	4	4	4	4	4	4	4	4	4.09
CO - 4	4	4	5	4	4	4	5	4	4	4	4	4.18
CO - 5	4	4	4	4	4	4	4	3	4	3	4	3.81
Overall Mean Score												**3.78**

Result: The Score for this Course is **3.78** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

1. **Introduction class**
    - Skin types
    - Threading
    - Face safety
2. **Manicure**
    - Skin type
    - Pedicure
    - Pedicure skin type
    - Waxing
3. **Hair cutting**
    - Baby cutting
    - Women cutting
4. **Hair dressing**
    - Hair curling
    - Hair straightening
    - Head massage
5. **Hair do**
    - Bridal hair do
    - Different types of Knot

Practical: HANDLING COSMETICS LAB-II

Semester: Non semester **Hours: 2**
Code : DCCHMCP2 **Credits: 1**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Classify the different types of mehandi in different occasion	PSO - 2	K, U
CO - 2	Equip their skills and creativities in nail care	PSO - 3	Ap, An
CO - 3	Apply the techniques as a beautician in skin bleaching	PSO - 3	Ap, An
CO - 4	Focus their carrier advancement as beautician	PSO - 3, PSO - 5	Ap
CO - 5	Inculcate business ethics	PSO - 5	K, Ap

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: Non Semester				Practical: HANDLING COSMETICS LAB-II							Hours: 2
Code : DCCHMCP2											Credits: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	4	4	4	5	4	3	4	3	4	4	4	3.90
CO - 2	4	3	3	3	4	4	4	3	4	4	4	3.63
CO - 3	4	5	4	4	4	4	4	4	4	4	4	4.09
CO - 4	4	4	5	4	4	4	2	4	4	4	4	3.90
CO - 5	4	4	5	4	4	4	2	3	4	3	4	3.73
Overall Mean Score												3.85

Result: The Score for this Course is **3.85** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

1. **Mehandi**
    a. Mehandi types
    b. Mehandi for different occasion
2. **Nail care**
    a. Nail polishing
    b. Nail shape
    c. Nail art
3. **Skin bleaching**
    a. Skin type
    b. Facial and types
4. **Saree draping models**
    a. Athpourey
    b. Nauvari
    c. Nivi
    d. Pinkosu
    e. Coorgi
5. **Bridal make up**
    a. Matte
    b. Natural
    c. Shimmer
    d. Smoky

DIPLOMA IN MODERN COSMETICS

(Non Semester) -Evaluation

CHEMISTRY OF MODERN COSMETICS

Code: DCCHMC01

Internal	External	Total
25	75	100

CIA Components

Component		Marks
Internal Test - I	:	40
Internal Test - II	:	40
Assignment	:	5
Quiz/Seminar	:	10
Attendance	:	5
Total	**:**	**100**

The total internal marks obtained for 100 will be converted into marks obtained for 25

Passing Minimum for Continuous Internal Assessment (CIA)	
Theory & Practical	40% out of 25 Marks (i.e. 10 Marks)

CHEMISTRY OF MODERN COSMETICS

Code: DCCHMC01

(External evaluation)

Time: 3 hours **Max. Marks: 75**

PART	Types of Question	Number of Qns.	Number of Qns. to be answered	Marks for each Qn.	Total
A Q. No (1-10)	Two questions from each unit	10	10	2	**20**
B Q. No (11-15)	either / or type. - one question from each unit	5	5	5	**25**
C Q. No (16-20)	Open choice - One question from each unit	5	3	10	**30**

Passing Minimum for Semester Examination	
Theory & Practical	40% out of 75 Marks (i.e. 30 Marks)

Practical: HANDLING COSMETICS LAB - I (Internal Only)

Code: DCCHMCP1

CIA Components for Internal Assessment

Component		Marks
Component- I (Manicure)	:	20
Component- II (Pedicure)	:	20
Component- III (Hair cutting)	:	20
Component- IV (Hair dressing)	:	20
Component- V (Hair do)	:	20
Total	**:**	**100**

Passing Minimum
40% out of 100 Marks

Practical: HANDLING COSMETICS LAB - II (Internal Only)

Code: DCCHMCP2

CIA Components for Internal Assessment

Component		Marks
Component- I (Mehandi)	:	20
Component- II (Nail care)	:	20
Component- III (Bleaching)	:	20
Component- IV (Saree Draping)	:	20
Component- V (Bridal Make up)	:	20
Total	**:**	**100**

Passing Minimum
40% out of 100 Marks