



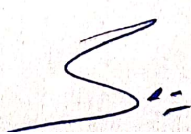
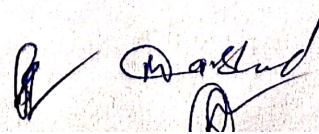
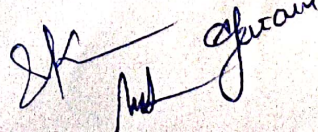


Remarks	Course	Paper(s)	Semester	Nomenclature of Paper	Credits	Hours /Week	Internal marks	External Marks	Total Marks	Exam Duration
Scheme A, B & C	VOC	B23-VOC-122	V	Chemistry of Fertilizers and Pesticides	3	3	20	50	70	3 hrs.
				Practical	1	2	10	20	30	3 hrs.
Scheme A, B, C & D	VOC	B23-VOC-123	V	Chemistry of Cosmetics and Perfumes	3	3	20	50	70	3hrs.
				Practical	1	2	10	20	30	3 hrs.
Scheme A, B, C & D	VOC	B23-VOC-321	VI	Green Laboratory Practical	3	3	20	50	70	3 hrs.
				Practical	1	2	10	20	30	3 hrs.

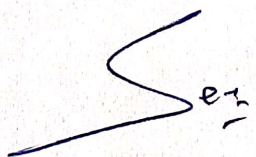
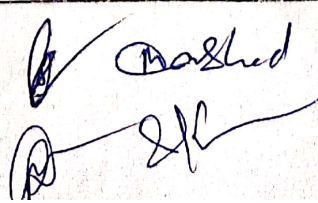
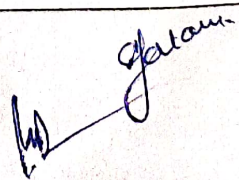
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VOC			
Session:2023-24			
Part A –Introduction			
Subject	Chemistry		
Semester	V		
Name of the Course	Chemistry of Fertilizers and Pesticides		
Course Code	B23-VOC-122		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VAC)	VOC		
Level of the course (As per Annexure-I	0-99		
Pre-requisite for the course (if any)	4.0		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. Know about fertilizers and nutrients; 2. Understand types of nitrate fertilizers; 3. Understand types of phosphate fertilizers; 4. Get the knowledge about pesticides. <hr/> 5*.Understand the issues involved in pesticides and fertilizers		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	45	30	75
Max. Marks: 70 +30* Internal Assessment Marks: 20+10* End Term Exam Marks:Theory: 50+20*		Time: Theory: Three Hours Practicum: Three Hours	
Part B- Contents of the Course			
<u>Instructions for Paper-Setter</u>			
Note: The examiner is requested to set nine questions in all, selecting two questions from each SECTION and one question (Question No.1 based on entire syllabus will consist of short answer type. All questions carry equal			

marks. The candidate is required to attempt five questions in all selecting one from each SECTION. Question No.1 is compulsory.

Unit	Topics	Contact Hours
I	Methods and time of fertilizer applications, tips to get best efficiency of Applied fertilizers, Integrated nutrient management, fertilizers and its relations to plant nutrients, Factors effecting optimum fertilizer dose.	12 Hrs
II	Classification and types of fertilizers, Nitrogenous fertilizers: Ammonium nitrate, Urea, Calcium Cyanamide, Calcium Ammonium Nitrate, Sodium Nitrate, Ammonium Chloride: Introduction, Raw materials, Action of as a fertilizers.	11Hrs
III	Phosphate fertilizers: Normal super phosphate, Triple Super Phosphate, Ammonium Phosphate. Potassic fertilizers (Types and optimum doses)	11Hrs
IV	Pesticides: Classification, synthesis, structure activity relationship(SAR), mode of action, uses and adverse effects of representative pesticides in the following classes: Organochlorines (DDT, Gammaxene); Organophosphates (Malathion, Parathion); Carbamates (Carbofuranand Carbaryl); Quinones (Chloranil), Anilides (Alachlor and Butachlor).	11Hrs
V*	<ol style="list-style-type: none"> To carryout market survey of potent pesticides with details as follows: a) Name of pesticide b) Chemical name, class and structure of pesticide c) Type of formulation available and Manufacturer's name d) Useful information on label of packaging regarding: Toxicity, LD50 ("Lethal Dose, 50%"), Side effects and Antidotes. To carryout market survey of potent botanical pesticides with details as follows: a) Botanical name and family; b) Chemical name (active ingredient) and structure of active ingredient; c) Type of formulation available and Manufacturer's name; d) Useful information on label of packaging regarding: Toxicity, LD50 ("Lethal Dose, 50%"), Side effects and Antidotes. Preparation of simple Organochlorine pesticides. To calculate acidity/alkalinity in given sample of pesticide formulations as per BIS specifications. To calculate active ingredient in given sample of pesticide formulations as per BIS specifications. Preparation of Neem based botanical pesticides. To study about identification of crops, seeds, fertilizers and pesticides. 	30 Hrs

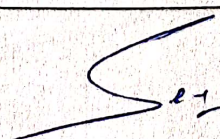

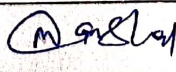
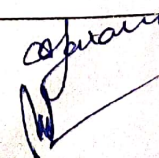
Suggested Evaluation Methods
Short Answer and MCQ Type QUESTIONS

<p>Internal Assessment: 20+10*=30</p> <p>➤ Theory: 20</p> <ul style="list-style-type: none"> ● Class Participation:05 ● Seminar/presentation/assignment/quiz/class test etc.: 05 ● Mid-Term Exam:10 <p>➤ Practicum: 10</p> <ul style="list-style-type: none"> ● Class Participation:05 ● Seminar/Demonstration/Viva-voce/Labrecords etc.:05 ● Mid-Term Exam: N.A. 	<p>End Term Examination: 50+20*</p>
Part C-Learning Resources	
<p>Recommended Books/e-resources/LMS:</p> <ol style="list-style-type: none"> 1. Gopal Rao: Outlines in Chemical Technology. 2. Shukla and Pandey: Introduction to Chemical Technology 3. Perry, A. S.; Yamamoto, I.; Ishaaya, I.; Perry, R.Y. (1998), Insecticides in Agriculture and Environment, Springer-Verlag Berlin Heidelberg. 4. Kuhr, R. J.; Derough, H.W. (1976), Carbamate Insecticides: Chemistry, Biochemistry and Toxicology, CRC Press,USA. 	

*Applicable for courses having practical component.

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VOC			
Session:2023-24			
PartA –Introduction			
Subject	Chemistry		
Semester	V		
Name of the Course	Chemistry of cosmetics & perfumes		
Course Code	B23-VOC-123		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VAC)	VOC		
Level of the course (As per Annexure-I	0-99		
Pre-requisite for the course (if any)	--		
Course Learning Outcomes (CLO):	<p>After completing this course,the learner will be able to:</p> <ol style="list-style-type: none"> 1. Get the knowledge of cosmetics; 2. Logically think regarding preparation strategies and uses of cosmetic products; 3. Understand about preparation strategies and uses of cosmetic creams; 4. Get to know about the essential oils preset in nature & their importance towards industrial uses. <p>5*.learn about practical hands involved in preparation of cosmetic products.</p>		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	45	30	75
Max. Marks: 70 +30* Internal Assessment Marks: 20 + 10* End Term Exam Marks: 50+20*		Time: Theory: Three Hours Practicum: Three Hours	
Part B- Contents of the Course			
<u>Instructions for Paper- Setter</u>			

Note: The examiner is requested to set nine questions in all, selecting two questions from each SECTION and one question (Question No.1 based on entire syllabus will consist of short answer type. All questions carry equal marks. The candidate is required to attempt five questions in all selecting one from each SECTION. Question No.1 is compulsory.

Unit	Topics	Contact Hours
I	Cosmetics-Definition, History, Classification ,Ingredients, Nomenclature, A general study including preparation and uses of the following: Hair dye, Hairspray, Shampoo, conditioners, Suntan lotions.	12 Hrs
II	Preparation and uses of Face powder, Lipsticks, Talcum powder, Nail enamel.	11 Hrs
III	Preparation and uses of creams (cold, vanishing, and shaving creams), Antiperspirants and Artificial flavours.	11 Hrs
IV	Essential oils and their importance in cosmetic industries with reference to Eugenol, Geraniol, Sandal wood oil, Eucalyptus, Rose oil, 2-Phenylethyl alcohol, Jasmone, Civetone, Muscone.	11 Hrs
V*	1. Preparation of Talcum powder. 2. Preparation of Shampoo. 3. Preparation of Enamels. 4. Preparation of Hair remover. 5. Preparation of Face cream. 6. Preparation of Nail polish. 7. Preparation of Nail polish remover.	30 Hrs

Suggested Evaluation Methods
Short Answer and MCQ Type QUESTIONS

Internal Assessment: 20+10* = 30 > Theory: 20 <ul style="list-style-type: none"> • Class Participation:05 • Seminar/presentation/assignment/quiz/classstestetc.:05 • Mid-Term Exam:10 > Practicum:10 <ul style="list-style-type: none"> • Class Participation: 05 • Seminar/Demonstration/Viva-voce/Lab record setc.: 05 • Mid-Term Exam: N.A. 	End Term Examination: 50+20*
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Part C- Learning Resources

Recommended Books/e-resources/LMS:

1. E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK.
2. P. C. Jain, M. Jain: *Engineering Chemistry*, Dhanpat Rai & Sons, Delhi.
3. B. K. Sharma: *Industrial Chemistry*, Goel Publishing House, Meerut.
4. Textbook of Cosmetics; MV imaladevi; CBS Publishers & Distributors; 2015,
5. ISBN 81-239-1103-3
6. Text Book of Cosmetics; Dr Akanksha Garud, Dr PK Sharma, Dr Navneet Garud; Pragati Prakashan; 2012, ISBN 978-93-5006-691-1
7. Pharmaceutics and Cosmetics; Praveen K. Gupta, Sanjeev K. Gupta; Pragati Prakashan; 2011, ISBN 978-81-8398-995-4
8. Chemistry of Cosmetics; R. Kumari; Prestige Publisher, 2018,
9. ISBN 978-81-936512-3-0
10. Formulation Guide For Cosmetics; The Nisshin Oil lio Group, Ltd.

*Applicable for courses having practical component.

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VOC			
Session:2023-24			
PartA –Introduction			
Subject	Chemistry		
Semester	VI		
Name of the Course	Green laboratory practices		
Course Code	B23-VOC-321		
Course Type: (CC/MCC/MDC/CC- M/DSEC/VOC/DSE/PC/AEC/VAC)	VOC		
Level of the course (As per Annexure-I	0-99		
Pre-requisite for the course (if any)	--		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: <ol style="list-style-type: none"> 1. Learn about green chemistry; 2. describe, how injudicious use of chemicals can have an adverse/potentially damaging effect on humans and the environment. 3. Propose ideas for innovative approach esto energy challenges. 4. Convert biomass into valuable chemicals through green technologies. 		
	5*.Hands on training towards green chemistry		
Credits	Theory	Practical	Total
	3	1	4
Contact Hours	45	30	75
Max.Marks: 70 +30* Internal Assessment Marks: 20 + 10* End Term Exam Marks: 50+20*		Time: Theory: Three Hours Practicum: Three Hours	
Part B-Contents of the Course			
<u>Instructions for Paper-Setter</u>			
Note: The examiner is requested to set nine questions in all, selecting two questions from each SECTION and one question (Question No.1 based on			

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Entire syllabus will consist of short answer type. All questions carry equal marks. The candidate is required to attempt five questions in all selecting one from each SECTION. Question No.1 is compulsory.

Unit	Topics	Contact Hours
I	Scheme for the traditional as well as green method for the synthesis of ibuprofen. Compare the amount and hazards of waste generated in both Green Methods in Chemistry. Preparation of propene by two methods can be studied (I) Hoffman elimination (II) Dehydration of propanol	11 Hrs
II	Prevention/minimization of hazardous/toxic products reducing toxicity. Risk= (function) hazards exposure: (a) Nitration of salicylic acid using green method $\text{Ca}(\text{NO}_3)_2$ (b) Preparation of dibenzalacetone by cross aldol condensation reaction using base catalysed green method (c) Acetylation of primary aromatic amine using the green method. Use of Green solvents and comparison of greenness of solvents: (a) Introduction to water as a solvent for chemical reactions. Preparation of Manganese(III) Acetylacetonate using green method (b) Advantages and application of solvent less processes in organic reactions. (c) Benzil-Benzilic acid rearrangement in solid State under solvent-free Condition.	12 Hrs
III	Energy requirements for reactions – alternative sources of energy: use of microwaves and photochemical energy. (a) Photoreduction of benzophenone to benzopinacol in the presence of sunlight. (b) Microwave assisted ammoniumformate-mediated Knoevenagel reaction: p-anisaldehyde, ethylcyanoacetate, ammoniumformate.	11 Hrs
IV	Importance of using catalytic reagents in preference to stoichiometric reagents; catalysis and green chemistry, comparison of heterogeneous and homogeneous catalysis, biocatalysis, asymmetric catalysis and photocatalysis. (a) Benzoin condensation using Thiamine Hydrochloride as a catalyst instead of cyanide (b) Rearrangement of diazoaminobenzene to p-aminoazobenzene using K10 montmorillonite clay	11 Hrs
V*	1. Dehydration of propanol 2. Nitration of salicylic acid using calcium nitrate 3. Photoreduction of benzophenone to benzopinacol in the	30 Hrs

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Presence of sunlight 4. Microwave assisted solvent free synthesis of aspirin 5. Synthesis of vitamin D3 using photochemical energy	
<p align="center">Suggested Evaluation Methods Short Answer and MCQ Type QUESTIONS</p>	
Internal Assessment: 20+10*=30 > Theory: 20 <ul style="list-style-type: none"> • Class Participation: 05 • Seminar/presentation/assignment/quiz/class test etc.: 05 • Mid-Term Exam: 10 > Practicum: 10 <ul style="list-style-type: none"> • Class Participation: 05 • Seminar/Demonstration/Viva-voce/Lab records etc.: 05 • Mid-Term Exam: N.A. 	End Term Examination: 70 (50+20*)
<p align="center">Part C- Learning Resources</p>	
Recommended Books/e-resources/LMS:	
Theory:	
<ol style="list-style-type: none"> 1. Anastas, P. T., Warner, J. C. (2014), Green Chemistry, Theory and Practice, Oxford University Press. 2. Lancaster, M. (2016), Green Chemistry: An Introductory Text, 3rd Ed., RSC Publishing. 3. Cann, M. C., Connely, M. E. (2000), Real-World cases in Green Chemistry, American Chemical Society, Washington. 4. Matlack, A. S. (2010), Introduction to Green Chemistry, 2nd Ed., CRC Press. 5. Alhuwalia, V. K.; Kidwai, M. R. (2012), New Trends in Green chemistry, Kluwer Academic Publishers, Springer. 6. Sidhwani, I. T; Sharma, R. K. (2020), An Introductory Text on Green Chemistry, Wiley India Pvt Ltd. 7. Etzkorn, F. A. (2019), Green Chemistry: Principles and Case Studies, Royal Society of Chemistry. 	
Practicals:	
<ol style="list-style-type: none"> 8. Kirchoff, M., Ryan, M. A. (2002), Greener approach to undergraduate chemistry experiment, American Chemical Society, Washington DC. 9. Sharma, R. K., Sidhwani, I. T., Chaudhari, M. K. (2013), Green Chemistry Experiments: A monograph, I. K. International Publishing House Pvt Ltd. New Delhi. 10. Pavia, D. L., Lamponam, G. H., Kriz, G.S.W. (2006), Introduction to organic Laboratory Technique- A Microscale approach, 4th Edition, Brooks-Cole Laboratory Series for Organic chemistry. 11. Sidhwani, I.T. ; Saini, G.; Chowdhury, S. Wealth from Waste: A green method to produce biodiesel from waste cooking oil and generation of useful products from waste further generated. University of Delhi, Journal of Undergraduate Research and Innovation, Volume 1, Issue 1, February 2015, ISSN: 2395-2334. 12. Sharma, R. K., Gulati, S., Mehta, S. (2012), Preparation of Gold Nanoparticles Using Tea: A Green Chemistry Experiment, Journal of Chemical Education, 89 (10), 1316-1318. 	

*Applicable for courses having practical component.

