DEPARTMENT OF MICROBIOLOGY				*CLASS: II B.Sc. Microbiology*				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/week**	**CIA**	**Ext**	**Total**
III	SBE - I	20U3RSM1	Cosmetic Microbiology	2	2	25	75	100

Nature of Course				
Knowledge and skill	✓		Employability oriented	
Skill oriented			Entrepreneurship oriented	

Course Objectives:

To understand the history of cosmetic microbiology

1. To understand the Fundamental concepts and manufacturing of cosmetics
2. To gain knowledge regarding cosmetics and microbiological testing of cosmetics
3. To know about the mechanism of preservation of cosmetic products
4. To gain knowledge of antimicrobial properties of natural cosmetic products

Course Learning Outcome:

On successful completion of the programme, the students will be able to

1. Outline the history, need and scope of microbiology, microbial limits on cosmetic products
2. Describe to make cosmetics on HACCP
3. Determine microorganisms in cosmetics using various testing methods
4. Apply precautions that prevent growth of microorganisms
5. Specify general characters and determine mode of action of various antimicrobial natural cosmetic microbiology

Unit	Description	Hours	K-level	CLO
I	**Unit - I: History and Scope of Cosmetic Microbiology** History and Scope of Cosmetic Microbiology- definition of Cosmetics–Need for cosmetic microbiology - Role of microbes in cosmetics preparation - Significance of Cosmetic Microbiology - Microbial limits for Cosmetic Products.	6Hrs	Up to K2	1
II	**Unit- II : Manufacturing Control of Cosmetics** Sanitary practices in cosmetic manufacturing - Microbial environment of the manufacturing plant - Hazard analysis and critical control point (HACCP) protocols in cosmetic microbiology - Microbiological Quality Controls of Cosmetic Products.	6Hrs	Up to K3	2
III	**Unit- III: Testing Methods of Cosmetics** Cosmetic microbiology test methods - Antimicrobial preservative efficacy and microbial content testing - Validation of methods. – Validation in Microbiology Laboratory – Media, microbial Content Test, Identification, Sterilizers, Decontamination.	6 Hrs	Up to K3	3

IV	**Unit- IV: Mechanism of Preservation of Cosmetics** Overview of biocide mechanism and suitability for use in cosmetic Preservation- Preservation of cosmetics - Preservation strategies - Mechanisms of action of Cosmetic preservatives -Preservative resistance - Global regulatory and toxicological aspects of cosmetic preservation- Consumer safety considerations of cosmetic preservation.	6 Hrs	Up to K3	4
V	**Unit- V: Antimicrobial Properties** Antimicrobial properties of natural cosmetic products – Garlic, Neem, Turmeric, Aloe vera and Tulsi. Antimicrobial Care Products – Dental Products, Consumer Hand and Body Washes - Hand Sanitizers and Wipes - Antiseptic Products used in healthcare Settings - Factors affecting effectiveness of antimicrobial preservative.	6 Hrs	Up to K4	5

Total 30 Hours

Books for Study

1. Philip, A.G. (2006). Cosmetic Microbiology. A Practical approach. 2nd Edition. Taylor & Francis group, New York.
2. Daniel K. Brannan. (1997). Cosmetic Microbiology: A practical handbook. CRC Press, Florida.

Books for Reference

1. Wilkinson, J.B., and Moore, R.J. (1982). Harry's Cosmeticology. 7th Edition. Chemical Publishing Company, New York.
2. Sharma, P.P. (1998). Cosmetics – Formulation, Manufacturing and Quality Control. 4th Edition. Vandana Publications Pvt. Ltd., New Delhi.
3. Hilda Butler and Poucher. W.A. (2000). Poucher's Perfumes, Cosmetics and Soaps. 10th Edition. Kluwer Academic Publishers, Boston.
4. André O. Barel, Marc Paye, Howard I. Maibach. (2009). Handbook of Cosmetic Science and Technology. 3rd Edition. Marianne Mahieu Informa Healthcare, USA.
5. Leon Lachmann and Herbert A Lienermann. (2013). Theory and Practice of Industrial Pharmacy. CBS Publishers & Distributors Pvt. Ltd.,New Delhi.
6. Rawlins, E.A. (1997) Bentley's Text book on pharmaceutics, 8th Edition. Bailliere Tindall Ltd., London.

Web Resources

1. https://www.fda.gov/cosmetics/resources-you-cosmetics/resources-industry-cosmetics
2. http://www.simbhq.org/docs/simbnews/SNND2013.pdf
3. https://www.criver.com/resources/webinar-pi-ms-importance-cosmetic-microbiology
4. https://www.fda.gov/cosmetics/potential-contaminants-cosmetics/microbiological-safety-and-cosmetics
5. https://www.sigmaaldrich.com/analytical-chromatography/microbiology.html
6. https://firstthingsfirst966.files.wordpress.com/2018/01/microbiology1.pdf
7. https://www.tentamus.com/microbiology-chemistry-cosmetics/
8. https://www.youtube.com/watch?v=Bpe2ROWKsZU

Rationale for Nature of the course

The purpose of this course is to share the unique knowledge of a small group of cosmetic microbiologists and cover all aspects that are critical to providing consumers with microbiologically safe products in a focused discussion that allows immediate application. The course will emphasize current trends in the selection of cosmetic ingredients.

Activities having direct impact on Skill development/Employability / Entrepreneurship

- Understanding all aspects that are critical for providing consumers with microbiologically safe products.
- Providing in depth learning in cosmetic science, which will serve as a focus for research into the field of cosmetic science.
- Applying knowledge on cosmetics in the field of related sciences, cosmeceuticals, personal care and hygiene products.

Pedagogy

Chalk and talk, PPT, Group discussion, Seminar, Screening of educational videos and quiz

Course Learning Outcomes (CLO)

CLOs	Course Learning Outcome *On successful completion of the programme, the students will be able to*	Knowledge Level
CLO1	Outline the history, need and scope of microbiology and microbial limits on cosmetic products.	Up to K2
CLO2	Explain the need of HACCP protocol in manufacturing cosmetics	Up to K3
CLO3	Determine Microorganisms in Cosmetics using various testing methods	Up to K3
CLO4	Apply precautions that prevent growth of Microorganisms	Up to K3
CLO5	Specify general characters and determine mode of action of various antimicrobial natural cosmetics.	Up to K4

K1 –Remembering and recalling facts with specific answers
K2 – Basic understanding of facts and stating main ideas with general answers
K3 – Application oriented – Solving Problems
K4 – Examining, analyzing, presentation and make interferences with evidences

Mapping of Course Learning Outcome with Programme Specific Outcome

	PSO1	PSO2	PSO3	PSO4	PSO5
CLO1	2	2	2	2	3
CLO2	2	2	2	3	2
CLO3	2	2	2	2	3
CLO4	3	2	2	2	2
CLO5	3	3	3	3	2

Advance application–3 Intermediate level –2 Basic level –1

Mapping of Course Outcome with Programme Outcome

	PO1	PO2	PO3	PO4	PO5
CLO1	2	2	3	2	2
CLO2	2	2	3	2	2
CLO3	2	3	2	2	3
CLO4	2	2	2	2	2
CLO5	3	2	2	2	2

Advance application–3 Intermediate level –2 Basic level –1

Learning Outcome Based Education & Assessment (LOBE)
Blue Print
Articulation Mapping – K Levels with Courses Learning Outcomes (CLOs)

S. No.	CLOs	K-Level	Section A		Section B		Section C (Either / or Choice)	Section D (Open Choice)
			MCQs		Short Answers			
			No. of Questions	K-Level	No. of Questions	K-Level		
1.	CLO 1	Up to K 3	2	K1 & K2	1	K1	2 (K1&K1)	1(K2)
2.	CLO 2	Up to K 3	2	K1 & K2	1	K1	2 (K2&K2)	1(K3)
3.	CLO 3	Up to K 3	2	K1 & K2	1	K2	2 (K3&K3)	1(K3)
4.	CLO 4	Up to K 3	2	K1 & K2	1	K2	2 (K3&K3)	1(K3)
5.	CLO 5	Up to K 4	2	K1 & K2	1	K2	2 (K4&K4)	1(K4)
No. of Questions to be asked			10		5		10	5
No. of Questions to be answered			10		5		5	3
Marks for each Question			1		2		5	10
Total Marks for each Section			10		10		25	30

K1 –Remembering and recalling facts with specific answers
K2 – Basic understanding of facts and stating main ideas with general answers
K3 – Application oriented – Solving Problems
K4 – Examining, analyzing, presentation and make interferences with evidences

Distribution of Section-wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (No Choice)	Section C (Either/or)	Section D (Open Choice)	Total Marks	% of Marks without choice	Consolidated
K1	5	4	10	-	**19**	15.8	**41.6%**
K2	5	6	10	10	**31**	25.8	
K3	-	-	20	30	**50**	41.7	**41.7%**
K4	-	-	10	10	**20**	16.7	**16.7%**
Total Marks	10	10	50	50	**120**	100.00	**100%**

LESSON PLAN

Units	Description	Staff	Hours	Mode
I History of Cosmetic Microbiology	a)History and Scope of Cosmetic Microbiology.		1	Chalk and Talk
	b)Definition of Cosmetics, Need for cosmetic microbiology,		2	
	c) Role of microbes in cosmetics preparation		1	
	d)Significance of Cosmetic Microbiology		1	
	e) Microbial limits for Cosmetic Products.		1	
II Manufacturing of Cosmetics	a) Sanitary practices in cosmetic manufacturing,.		2	Chalk and Talk
	b)Microbial environment of the manufacturing plant		1	
	c)Hazard analysis and critical control point (HACCP) protocols in cosmetic microbiology		2	
	d)Microbiological Quality Controls of Cosmetic Products		1	
III Testing Methods of Cosmetics	a)Cosmetic microbiology test methods		1	Chalk and Talk & PPT
	b)Antimicrobial preservative efficacy and microbial content testing		1	
	c)Validation of methods. Validation in Microbiology Laboratory – Media		2	
	d) microbial Content Test Identification, Sterilizers, Decontamination.		2	
IV Mechanism of Preservation of Cosmetics	a)Overview of biocide mechanism and suitability for use in cosmetic Preservation		2	PPT & Chalk and Talk
	b)Preservation of cosmetics - Preservation strategies - Mechanisms of action of Cosmetic preservatives. - Preservative resistance.		2	
	c)Global regulatory and toxicologic aspects of cosmetic preservation-		1	
	d)Consumer safety considerations of cosmetic preservation.		1	

V Antimicrobial Properties	a)Antimicrobial properties of natural cosmetic products – Garlic, Neem, Turmeric, Aloe vera and Tulsi		2	PPT
	b)Antimicrobial Care Products – Dental Products, Consumer Hand and Body Washes ,Hand Sanitizers and Wipes		2	
	c)Antiseptic Products used in healthcare Settings.		1	
	d)Factors affecting effectiveness of antimicrobial preservative.		1	
Total			**30 Hours**	

Course designers : 1. Mrs. N.Sumathy