University of Mumbai

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Academic Authorities,
Meetings &Services (AAMS)
Room No. 128, M. G. Road, Fort,
Mumbai – 400 032.
Tel. 022-68320033

Re- accredited with A ++ Grade (CGPA 3.65) by NAAC
Category- I University Status awarded by UGC

No. AAMS_UGS/ICD/2024-25/425 Date : 24th March, 2025.

To,
The Director,
Garware Institute of Career Education
and Development,
Vidyanagari
Santacruz (East)
Mumbai – 400 098.

Sub : B.Sc (Paint Technology) (Three year) (Sem I & II)

Sir,

With reference to the subject noted above, this is to inform you that the recommendations made by the **Advisory Committee & Board of Management** of Garware Institute of Career Education & Development at its Meeting held on **4th September, 2023** & resolution passed by the **Board of Deans** at its meeting held on **9th August, 2023** vide Item No. **9.2** have been accepted by the **Academic Council** at its meeting held on **1st November, 2023** vide Item no. **9.3 (C) 1 (N)** and subsequently approved by the **Management Council** at its meeting held on **14th August, 2024** vide Item No. **6** that in accordance therewith, in exercise of the powers conferred upon the Management Council under Section 74(4) of the Maharashtra Public Universities Act, 2016 (Mah. Act No. VI of 2017) the following program with Ordinance for Title of the Program, Eligibility and Regulation numbers for Duration of Program, Intake Capacity, Scheme of Examinations, Standard of Passing and Credit Structure along with syllabus of **B.Sc (Paint Technology) (Sem I & II)** (Appendix – 'A') have been introduced and the same have been brought into force with effect from the academic year **2023-24**.

The New Ordinances & Regulations as per NEP 2020 is as follows :-

Sr. No.	Name of the Program	Ordinance no. for Title	Ordinance no. for Eligibility	Duration
A	U.G. Certificate in Paint Technology	O.GUA – 515 A	O.GUA – 516 A	One year
B	U.G. Diploma in Paint Technology	O.GUA – 515 B	O.GUA – 516 B	Two year
C	B.Sc (Paint Technology)	O.GUA – 515 C	O.GUA – 516 C	Three year
D	B.Sc (Hons) (Paint Technology)	O.GUA – 515 D	O.GUA – 516 D	Four year

2/-

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No. AAMS_UGS/ICD/2024-25/425 Date: 24th March, 2025

Regulation Nos	
Duration	R.GUA – 536
Intake Capacity	R.GUA – 537
Scheme of examination	R.GUA – 538
Standard of Passing	R.GUA – 539
Credit Structure	R.GUA – 540 A
	R.GUA – 540 B
	R.GUA – 540 C
	R.GUA – 540 D
	R.GUA – 540 E
	R.GUA – 540 F
	R.GUA – 540 G
	R.GUA – 540 H

(Dr. Prasad Karande)
REGISTRAR

A.C/9.3(C)1(N)/01/11/2023
M.C/6/14/8/2024

****

Copy forwarded with Compliments for information to:-

1) The Chairman, Board of Deans
2) The Dean, Faculty of Science & Technology.
3) The Director, Board of Examinations and Evaluation,
4) The Director, Board of Students Development,
5) The Director, Department of Information & Communication Technology,
6) The Co-ordinator, MKCL.

Copy forwarded for information and necessary action to :-	
1	The Deputy Registrar, (Admissions, Enrolment, Eligibility and Migration Dept)(AEM), dr@eligi.mu.ac.in
2	The Deputy Registrar, Result unit, Vidyanagari drresults@exam.mu.ac.in
3	The Deputy Registrar, Marks and Certificate Unit,. Vidyanagari dr.verification@mu.ac.in
4	The Deputy Registrar, Appointment Unit, Vidyanagari dr.appointment@exam.mu.ac.in
5	The Deputy Registrar, CAP Unit, Vidyanagari cap.exam@mu.ac.in
6	The Deputy Registrar, College Affiliations & Development Department (CAD), deputyregistrar.uni@gmail.com
7	The Deputy Registrar, PRO, Fort, (Publication Section), Pro@mu.ac.in
8	The Deputy Registrar, Executive Authorities Section (EA) eau120@fort.mu.ac.in He is requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to the above circular.
9	The Deputy Registrar, Research Administration & Promotion Cell (RAPC), rapc@mu.ac.in
10	The Deputy Registrar, Academic Appointments & Quality Assurance (AAQA) dy.registrar.tau.fort.mu.ac.in ar.tau@fort.mu.ac.in
11	The Deputy Registrar, College Teachers Approval Unit (CTA), concolsection@gmail.com
12	The Deputy Registrars, Finance & Accounts Section, fort draccounts@fort.mu.ac.in
13	The Deputy Registrar, Election Section, Fort drelection@election.mu.ac.in
14	The Assistant Registrar, Administrative Sub-Campus Thane, thanesubcampus@mu.ac.in
15	The Assistant Registrar, School of Engg. & Applied Sciences, Kalyan, ar.seask@mu.ac.in
16	The Assistant Registrar, Ratnagiri Sub-centre, Ratnagiri, ratnagirisubcentar@gmail.com
17	The Director, Centre for Distance and Online Education (CDOE), Vidyanagari, director@idol.mu.ac.in
18	Director, Innovation, Incubation and Linkages, Dr. Sachin Laddha pinkumanno@gmail.com
19	Director, Department of Lifelong Learning and Extension (DLLE), dlleuniversityofmumbai@gmail.com

Copy for information :-	
1	P.A to Hon'ble Vice-Chancellor, vice-chancellor@mu.ac.in
2	P.A to Pro-Vice-Chancellor pvc@fort.mu.ac.in
3	P.A to Registrar, registrar@fort.mu.ac.in
4	P.A to all Deans of all Faculties
5	P.A to Finance & Account Officers, (F & A.O), camu@accounts.mu.ac.in

To,

1	The Chairman, Board of Deans pvc@fort.mu.ac.in
2	**Faculty of Humanities,** **Dean** 1. Prof.Anil Singh Dranilsingh129@gmail.com **Associate Dean** 2. Dr.Suchitra Naik Naiksuchitra27@gmail.com 3.Prof.Manisha Karne mkarne@economics.mu.ac.in
	Faculty of Commerce & Management, **Dean** 1. Dr.Kavita Laghate kavitalaghate@jbims.mu.ac.in **Associate Dean** 2. Dr.Ravikant Balkrishna Sangurde Ravikant.s.@somaiya.edu 3. Prin.Kishori Bhagat kishoribhagat@rediffmail.com

	Faculty of Science & Technology **Dean** 1. Prof. Shivram Garje ssgarje@chem.mu.ac.in **Associate Dean** 2. Dr. Madhav R. Rajwade Madhavr64@gmail.com 3. Prin. Deven Shah sir.deven@gmail.com
	Faculty of Inter-Disciplinary Studies, **Dean** 1.Dr. Anil K. Singh aksingh@trcl.org.in **Associate Dean** 2.Prin.Chadrashekhar Ashok Chakradeo cachakradeo@gmail.com
3	Chairman, Board of Studies,
4	The Director, Board of Examinations and Evaluation, dboee@exam.mu.ac.in
5	The Director, Board of Students Development, dsd@mu.ac.in DSW direcotr@dsw.mu.ac.in
6	The Director, Department of Information & Communication Technology, director.dict@mu.ac.in

AC-1/11/2023
Item No- 9.3 (C) - 1

As Per NEP 2020

University of Mumbai

Title of the program

A- U.G. Certificate in Paint Technology
B- U.G. Diploma in Paint Technology
C- B.Sc. Paint Technology
D- B.Sc.(Hons.) Paint Technology

Syllabus for
Semester- Semester I and II

Ref: GR dated 20th April,2023 for Credit Structure of UG

(with effect from the academic year 2023-24 Progressively)

Garware Institute of Career Education and Development

UNIVERSITY OF MUMBAI

(AS PER NEP 2020)

Sr. No.	Heading	Particulars	
1	Title of program O: GUA-515 A	A	U.G. Certificate in Paint Technology
	O: GUA-515 B	B	U.G. Diploma in Paint Technology
	O: GUA-515 C	C	B.Sc. Paint Technology
	O: GUA-515 D	D	B.Sc.(Hons.) Paint Technology
2	Eligibility O: GUA-516 A	A	HSC (Science) Or Equivalent (Vocational Science with 2 Years' Experience). OR 3 Years Government Recognized Diploma in Engineering (Any Field) Admissions based on Written Test & Interview. 50% passing marks in the Entrance assessment **OR** Passed Equivalent Academic Level 4.0
	O: GUA-516 B	B	1. The candidate who has successfully completed U.G. Certificate in Paint Technology. **OR** Passed Equivalent Academic Level 4.5 2. The candidate whose Under Graduate Certificate credits are 60% equivalent to U.G. Diploma in Paint Technology & he/she earns minimum 8 Credits from U.G. Certificate in Paint Technology. 3. As per NEP criteria on the basis of RPL- Recognition of Prior Learning, Candidate to be admitted to 2nd Year subject to He/she securing minimum 50% in the 1st Year assessment of U.G. Certificate in Paint Technology.

	O: GUA-516 C	C	1. The candidate who has successfully completed U.G. Diploma in Paint Technology. **OR** Passed Equivalent Academic Level 5.0 2. The candidate whose Under Graduate Diploma credits are 60% equivalent to B.Sc. Paint Technology & he/she earns minimum 8 Credits from U.G. Diploma in Paint Technology. 3. As per NEP criteria on the basis of RPL- Recognition of Prior Learning, Candidate to be admitted to 3rd Year subject to He/she securing minimum 50% in the 2nd Year assessment of U.G. Diploma in Paint Technology.
	O: GUA-516 D	D	The candidate who has successfully completed B.Sc. Paint Technology. with minimum CGPA of 7.5 **OR** Passed Equivalent Academic Level 5.5
3	R: GUA - 536 Duration of Program	A	1 Year
		B	2 Years
		C	3 Years
		D	4 Years
4	R: GUA-537 Intake Capacity	120	
5	R: GUA-538 Scheme of Examination	NEP 50% Internal – Continuous Evaluation 50% External- Semester End Examination Individual Passing in Internal and External Examination	
6	R: GUA -539 Standards of Passing	50% in each component	
7	Credit Structure R: GUA -540 A R: GUA -540 B R: GUA -540 C R: GUA -540 D R: GUA -540 E R: GUA -540 F R: GUA -540 G R: GUA -540 H	Attached herewith	
8	Semesters	A	Sem I & II
		B	Sem I, II, III, & IV
		C	Sem I, II, III, IV, V, & VI
		D	Sem I, II, III, IV, V, VI, VII & VIII

9	Program Academic Level	A	4.5
		B	5.0
		C	5.5
		D	6.0
10	Pattern	Semester	
11	Status	New	
12	To be implemented fromAcademic Year	From Academic Year 2023-24	

Dr. Keyurkumar M. Nayak,
Director,
UM-GICED

Prof. (Dr.) Shivram S. Garje
Dean, Faculty of Science

Preamble

1) Introduction

- The Paint industry is growing at a very fast rate.
- The production of Paints, Pigments and Resins is increased several times over the years.
- The surface area for application has changed due to Infrastructure development, improved standards of living, expansion of industries and better dwellings.
- This growth requires trained and skilled personnel to take up leading roles. This has created a greater demand for Technologists and is more than the supply including all institutions taken together.

2) Aims and Objectives

- To produce graduates and post graduates who will be able to meet the requirements and challenges at national & international levels in the field of formulation, manufacture and application of paints and allied products
- To inculcate in students, the fundamental and molecular concepts related to resins, polymers, pigments and additives to enable them to develop novel technologies to meet the global standards of eco-friendliness & sustainability.
- To produce technologists with high moral values and professional ethics, who can work with industry hand-in-hand for mutual benefits and to sensitize them for job creation for the society, specially the rural community.

3) Learning Outcomes

- The expansion of the paint industry has created good job opportunities to paint technologists.
- The demand exists in manufacturing, application, quality control and techno- commercial aspects in various industries viz., paint, resins, pigments and allied industries, furniture, automobile, plastic, ship building, and printing inks as well.
- Students should be able to apply the acquired knowledge in the professional world related to formulation, manufacture and application of paints, coatings and allied products and should be sensitized technocrats towards using indigenous resources and infrastructure to develop novel technologies compatible with the startup mission of India.
- Graduates should be able to handle research and development assignments in industry and should be welcome candidates for higher studies in high profile national and international institutes/universities with a strong concern for environment and social issues.
- It is also possible to become an entrepreneur or a painting contractor.

4) Any other point (if any)

5) Baskets of Electives

Elective Basket For Semester I, II, III & IV				
Option	Subject	Marks	Credits	Hours
1	Introduction to Paints & Surface Coatings –I	50	2	30 Hours
2	Introduction to Paints & Surface Coatings –II	50	2	30 Hours
3	Basic Paint Manufacturing – I	50	2	30 Hours
4	Basic Paint Manufacturing – II	50	2	30 Hours
5	Unit Operations-II	50	2	30 Hours
6	Construction Engineering-I	50	2	30 Hours
7	Construction Engineering-II	50	2	30 Hours
8	Advanced Resin Technology	50	2	30 Hours
9	Decorative Paints-II	50	2	30 Hours
10	Basic Paint Application-I	50	2	30 Hours
11	Basic Paint Application – II	50	2	30 Hours
12	Paint Technology-I	50	2	30 Hours
13	Paint Technology-II	50	2	30 Hours
14	System & Engineering Aspects in SurfaceCoatings-I	50	2	30 Hours
15	System & Engineering Aspects in SurfaceCoatings-II	50	2	30 Hours
16	Project Management-I	50	2	30 Hours

6) Credit Structure of the program – (Parishisth-2)

B.Sc. (Hons.) in Paint Technology											
Curriculum Framework											
FIRST YEAR											
Level	**Semester**	**Major**		**Minor**	**OE**	**VC,SEC**	**AEC, VEC, IKS**	**OJT, FP, CEP, CC, RP**	**Cum.Cr./ Sem.**	**Cumulative**	
		Mandatory	**Electives**								
Level 4.5	1	Unit Operations -I (T) (2 Credits) Industrial Chemistry (T) (4 Credits)			Introduction to Paints & Surface Coatings -I (T) (2 Credits) OR Introduction to Paints & Surface Coatings -II (T) OR Unit Operations-II OR Construction Engineering-I & II (2 Credits)	VC: Computer Lab/IT (T) (2 Credits) SEC: Practical's (P) (2 Credits)	AEC: Communication Skills - I (T) (2 Credits) VEC: Green Audit -I (T) (2 Credits) IKS: Indian Painting System (T) (2 Credits)	CC: Health and Wellness (P) (2 Credits)	22	44	UG Certificate 44
	Credits	**6**	**0**	**0**	**4**	**4**	**6**	**2**			
	2	Pigments, Solvents and Additives (T) (4 Credits) Resin Technology -I (T) (2 Credits)	——	Decorative Paints -I (T) (2 Credits)	Basic Paint Manufacturing-I (T) (2 Credits) OR Basic Paint Manufacturing-II OR Advanced Resin Technology OR Decorative Paints-II OR Basic Paint Application-I OR Basic Paint Application – II (T) (2 Credits)	VC: Paint Application Technique –I (T) (2 Credits) SEC: Paint Application Technique – II (T) (2 Credits)	AEC: Communication Skills – II (T) (2 Credits) VEC: Green Audit - II (T) (2 Credits)	CC: Practical (P) (2 Credits)	22		
	Credits	**6**	**0**	**2**	**4**	**4**	**4**	**2**			
	Cum. Cr.	**12**	**0**	**2**	**8**	**8**	**10**	**4**			**44**
Exit Option: Award of UG Certificate in Major with 44 credits and an additional 4 credit core NSQF course / Internship OR Continue with Major and Minor											

SECOND YEAR											
Level	**Sem**	**Major**		**Minor**	**OE**	**VC,SEC (VSEC)**	**AEC, VEC, IKS**	**OJT, FP, CEP, CC, RP**	**Cum. Cr/Sem.**	**Cumulative**	
		Mandatory	**Electives**								
Level 5.0	**3**	Industrial Coatings - I (T) (4 Credits) Industrial Finishing - I (T) (4 Credits)	____	Printing Inks and Specialty Coatings (T) (4 Credits)	Paint Technology (T) (2 Credits) OR Metallurgy (T) (2 Credits)	VC: Practical's (P) (2 Credits)	AEC: Paint Technology-II (T) (2 Credits)	FP: Field Project –I (P) (2 Credits) CC: Auto CAD (P) (2 Credits)	**22**	**88**	UG Diploma 88
	Credits	**8**	**0**	**4**	**2**	**2**	**2**	**4**			
	4	Protective Coatings-I (T) (4 Credits) Industrial Finishing - II (T) (4 Credits)	____	Economics of Painting (T) (4 Credits)	Systems-& Engineering Aspects in Surface Coating -I (T) (2 Credits) OR Systems-& Engineering Aspects in Surface Coating -I OR Project Management-I (T) (2 Credits)	SEC: Project Management -II (T) (2 Credits)	AEC: Entrepreneurship (T) (2 Credits)	CEP: Community Engagement Programme (P) (2 Credits) CC: Practical (P) (2 Credits)	**22**		
	Credits	**8**	**0**	**4**	**2**	**2**	**2**	**4**			
	Total Credits in 2nd Year	**16**	**0**	**8**	**4**	**4**	**4**	**8**			**44**
	Cum. Cr.	**28**	**0**	**10**	**12**	**12**	**14**	**12**	**88**		

Exit Option: Award of UG Diploma in Major and Minor with 88 credits and an additional 4 credit core NSQF course / Internship OR Continue with Major and Minor

THIRD YEAR											
Level	**Semester**	**Major**		**Minor**	**OE**	**VC,SEC**	**AEC, VEC, IKS**	**OJT, FP, CEP, CC, RP**	**Cum. Cr./ Sem.**	**Cumulative**	
		Mandatory	**Electives**								
	5	Safety, Health and Environment-I (T) (2 Credits) Protective Coatings-II (T) (4 Credits) Resin Technology-II (T) (4 Credits)	Administration and Cost Management (T) (4 Credits) OR Basic Test Methods in Coatings (T) (4 Credits)	Industrial Coatings-II (T) (4 Credits)	-	VC: Safety, Health and Environment-II (T) (2 Credits)	____	FP: Field Project –II (P) (2 Credits)	22		
	Credits	**10**	**4**	**4**	**0**	**2**	**0**	**2**			
Level 5.5	6	Quality Management (T) (4 Credits) People Management (T) (4 Credits) Nanotechnology (T) (2 Credits)	Factory Management (T) (4 Credits) OR Sales and Distribution Management (4 Credits)	Construction Chemicals (T) (4 Credits)				Internship and Industrial Training (P) (4Credits)	22		UG Degree 132
	Credits	**10**	**4**	**4**	**0**	**0**	**0**	**4**			
	Credits in 3rd Year	**20**	**8**	**8**	**0**	**2**	**0**	**6**			44
	Cum. Cr.	**48**	**8**	**18**	**12**	**14**	**14**	**18**	**132**		
Exit Option: Award of UG Degree in Major with 132 credits OR Continue with Major and Minor											

Year	Level	Sem	Major			Minor	RM	OJT / FP	RP	Cum. Cr.	Degree
			Mandatory		Electives Any one						
I	6.0	Sem 7	Paint Technology-I	**Credits: 4**	**Credits 4** Paint Technology-II **OR** **Credits 4** Cost Management in Paint Industry OR **Credits 4** Communication skills for Paint Technocrats **Credits 4** Practical	--	Research Methodology 4			**22**	PG Diploma (after 3-yr UG or PG Degree)
			Resin Technology I	**Credits: 4**							
			Pigment Technology-I	**Credits: 4**							
			Printing Ink Technology-I	**Credits: 2**							
				14	**4**		**4**	**0**	**0**	**22**	
		Sem 8	Pigment Technology-II	**Credits: 4**	**Credits 4** Paint Technology -V **Credits 4** Printing Ink Technology-II **Credits 4** Practical	---		FP			
			Resin Technology-II	**Credits: 2**							
			Paint Technology – III	**Credits: 4**							
			Paint Technology-IV	**Credits: 4**							
				14	**4**	**0**	**0**	**4**	**0**	**22**	
Cum. Cr.			**28**		**8**	**0**	**4**	**4**	0	**44**	
			74		**16**	**18**	**22**	**4**	6	**176**	
	Four Years UG Honors Degree in Major and Minor with 176 credits										

Dr. Keyurkumar M. Nayak,
Director,
UM-GICED

Prof. (Dr.) Shivram S. Garje
Dean, Faculty of Science

Semester - I									
	Subject Code	**Core Subject**	**Assessment Pattern**			**Teaching Hours**			
Semester 1		**Topics**	**Internal Marks 50**	**External Marks 50**	**Total Marks (CA) 50/ 100**	**Theory Hours**	**Practical hours**	**Total Hours**	**Total Credits**
	Major Mandatory								
	B.Sc.PTS1MJP1	Industrial Chemistry	50	50	100	60	--	60	4
	B.Sc.PTS1MJP2	Unit Operations-I	25	25	50	30	--	30	2
	Open Elective (OE) (Any Two)								
	B.Sc.PT S1P3A	Introduction to Paints & Surface Coatings-I	25	25	50	30	--	30	2
	B.Sc.PT S1P3B	Introduction to Paints & Surface Coatings-II	25	25	50	30	--	30	2
	B.Sc.PT S1P3C	Unit Operations-II	25	25	50	30	--	30	2
	B.Sc.PT S1P3D	Construction Engineering-I	25	25	50	30	--	30	2
	B.Sc.PT S1P3E	Construction Engineering-II	25	25	50	30	--	30	2
	Vocational Courses (VC)								
	B.Sc.PT S1P4	Computer Lab/IT	25	25	50	30	--	30	2
	Skill Enhancement Courses (SEC)								
	B.Sc.PT S1P5	Practical	100	--	100	--	60	60	2
	Ability Enhancement Courses (AEC)								
	B.Sc.PT S1P6	Communication Skills - I	25	25	50	30	--	30	2
	Value Education Course (VEC)								
	B.Sc.PT S1P7	Green Audit-I	25	25	50	30	--	30	2
	Indian Knowledge System (IKS)								
	B.Sc.PT S1P8	Indian Painting System	25	25	50	30	--	30	2
	Co-curricular Courses (CC)								
	B.Sc.PTS1P9	Health & Wellness	50		50	-	60	60	2
		Total	**375**	**225**	**600**	**270**	**120**	**390**	**22**

Semester-2	Semester - II								
	Major Mandatory								
	B.Sc.PT S2MJP10	Pigments, Solvents and Additives	50	50	100	60	--	60	4
	B.Sc.PT S2MJP11	Resin Technology-I	25	25	50	30	--	30	2
	Minor								
	B.Sc.PT S2MRP12	Decorative Paints-I	25	25	50	30	--	30	2
	Open Elective (OE) (Any Two)								
	B.Sc.PTS2P13	Basic Paint Manufacturing-I	25	25	50	30	--	30	2
	B.Sc.PTS2P14A	Basic Paint Manufacturing-II	25	25	50	30	--	30	2
	B.Sc.PTS2P14B	Advanced Resin Technology	25	25	50	30	--	30	2
	B.Sc.PTS2P14C	Decorative Paints-II	25	25	50	30	--	30	2
	B.Sc.PTS2P14D	Basic Paint Application-I	25	25	50	30	--	30	2
	B.Sc.PTS2P14E	Basic Paint Application – II	25	25	50	30	--	30	2
	Vocational Courses (VC)								
	B.Sc.PTS2P15	Paint Application Technique-I	25	25	50	30	--	30	2
	Skill Enhancement Courses (SEC)								
	B.Sc.PTS2P16	Paint Application Technique-II	25	25	50	30	--	30	2
	Ability Enhancement Courses (AEC)								
	B.Sc.PTS2P17	Communication Skills - II	25	25	50	30	--	30	2
	Value Education Course (VEC)								
	B.Sc.PTS2P18	Green Audit-II	25	25	50	30	--	30	2
	Co-curricular Courses (CC)								
	B.Sc.PTS2P19	Practical	50		50	--	60	60	2
		Total	**300**	**250**	**550**	**300**	**60**	**360**	**22**

Semester - III

	Subject Code	Core Subject	Assessment Pattern			Teaching Hours			
		Topics	Internal Marks 50	External Marks 50	Total Marks (CA) 50/ 100	Theory Hours	Practical hours	Total Hours	Total Credits
Semester-3									
	Major Mandatory								
	B.Sc.PT MJS3P20	Industrial Coatings- I	50	50	100	60	--	60	4
	B.Sc.PT MJS3P21	Industrial Finishing-I	50	50	100	60	--	60	4
	Minor								
	B.Sc.PTMRS3P22	Printing inks & specialty coatings	50	50	100	60	--	60	4
	Open Elective (OE) (Any One)								
	B.Sc.PTS3P23A	Paint Technology-I	25	25	50	30	--	30	2
	B.Sc.PTS3P23B	Metallurgy	25	25	50	30	--	30	2
	Value Education Course (VEC)								
	B.Sc.PTS3P24	Practical	50		50	--	60	60	2
	Ability Enhancement Courses (AEC)								
	B.Sc.PTS1P25	Paint Technology-II	50	--	50	30	--	30	2
	Value Education Course (VEC)								
	B.Sc.PTS1P26	Field Project-I	50	--	50	--	60	60	2
	Co-curricular Courses (CC)								
	B.Sc.PTS1P27	Auto CAD	50	--	50	--	60	60	2
		Total	**375**	**175**	**550**	**240**	**180**	**420**	**22**
Semester-4	**Semester - IV**								
	Major Mandatory								
	B.Sc.PT S4MJP28	Protective Coating-I	50	50	100	60	--	60	4
	B.Sc.PT S4MJP29	Industrial Finishing - II	50	50	100	60	--	60	4
	Minor								
	B.Sc.PT S4MRP30	Economics of Painting	50	50	100	60	--	60	4
	Open Elective (OE) (Any One)								
	B.Sc.PT S4P31A	System & Engineering Aspects in Surface Coatings-I	25	25	50	30	--	30	2
	B.Sc.PT S4P31B	System & Engineering Aspects in Surface Coatings-II	25	25	50	30	--	30	2
	B.Sc.PT S4P31C	Project Management-I	25	25	50	30	--	30	2

	Skill Enhancement Courses (SEC)								
	B.Sc.PT S4P32	Project Management-II	25	25	50	30	--	30	2
	Ability Enhancement Courses (AEC)								
	B.Sc.PT S4P33	Entrepreneurship	25	25	50	30	--	30	2
	Community Engagement Programme (CEP)								
	B.Sc.PT S4P34	Community Engagement Programme	50		50	--	60	60	2
	Co-curricular Courses (CC)								
	B.Sc.PT S4P35	Practical	50		50	--	60	60	2
		Total	**325**	**225**	**550**	**270**	**120**	**390**	**22**

Semester - V									
	Subject Code	Core Subject	Assessment Pattern			Teaching Hours			
Semester-5		Topics	Internal Marks 50	External Marks 50	Total Marks (CA) 50/ 100	Theory Hours	Practical hours	Total Hours	Total Credits
	Major Mandatory								
	B.Sc.PT S5MJP36	Safety Health and Environment-I	25	25	50	30	--	30	2
	B.Sc.PTS5MJP37	Protective Coatings – II	50	50	100	60	--	60	4
	B.Sc.PTS5MJP38	Resin Technology-II	50	50	100	60	--	60	4
	Major Elective (ME)								
	B.Sc.PTS5MJP39A	Administration and Cost Management	50	50	100	60	--	60	4
	B.Sc.PTS5MJP39B	Basic Test Methods in Coatings	50	50	100	60	--	60	4
	Minor								
	B.Sc.PTMRS5P40	Industrial Coatings -II	50	50	100	60	--	60	4
	Vocational Courses (VC)								
	B.Sc.PTS5P41	Safety Health and Environment-II	25	25	50	30	--	30	2
	Field Project (FP)								
	B.Sc.PTS5P42	Field Project-II	50		50	--	60	60	2
		Total	**300**	**250**	**550**	**300**	**60**	**360**	**22**
Semester-6	**Semester - VI**								
	Major Mandatory								
	B.Sc.PT MJS6P43	Quality Management	50	50	100	60	--	60	4
	B.Sc.PTMJS6P44	People Management	50	50	100	60	--	60	4
	B.Sc.PT MJS6P45	Nanotechnology	25	25	50	30	--	30	2
	Electives								
	B.Sc.PT S6P46A	Factory Management	50	50	100	60	--	60	4
	B.Sc.PT S6P46B	Sales and Distribution Management	50	50	100	60	--	60	4
	Minor								
	B.Sc.PTS6MRP47	Construction Chemicals	50	50	100	60	--	60	4
	Ongoing Job Training (OJT)								
	B.Sc.PT S6P48	Internship and Industrial Training	100		100	--	60	60	4
		Total	**325**	**225**	**550**	**270**	**60**	**330**	**22**

	Semester - VII								
	Subject Code	Core Subject	Assessment Pattern			Teaching Hours			
Semester-7		Topics	Internal Marks 50	External Marks 50	Total Marks (CA) 50/ 100	Theory Hours	Practical hours	Total Hours	Total Credits
	Major Mandatory								
	B.Sc.PT MJS7P49	Paint Technology – I	50	50	100	60	--	60	4
	B.Sc.PT MJS7P50	Resin Technology-I	50	50	100	60	--	60	4
	B.Sc.PTMJS7P51	Pigment Technology-I	50	50	100	60	--	60	4
	B.Sc.PTMJS7P52	Printing Ink Technology-I	25	25	50	30	--	30	2
	Major Electives								
	B.Sc.PT MJS7P53A	Paint Technology-II	50	50	100	60	--	60	4
	B.Sc.PT MJS7P53B	Cost Management in Paint Industry	50	50	100	60	--	60	4
	B.Sc.PT MJS7P53C	Communication skills for Paint Technocrats	50	50	100	60	--	60	4
	B.Sc.PT MJS7P53D	Practical	100		100		60	60	4
	Minor								
	B.Sc.PTMRS7P54	Research Methodology	50	50	100	60	--	60	4
		Total	**225**	**275**	**550**	**330**	**60**	**330**	**22**
Semester–8	**Semester - VIII**								
	Major Mandatory								
	B.Sc.PT MJS8P55	Pigment Technology-II	50	50	100	60	--	60	4
	B.Sc.PT MJS8P56	Resin Technology-II	25	25	50	30	--	30	2
	B.Sc.PT MJS8P57	Paint Technology – III	50	50	100	60	--	60	4
	B.Sc.PT MJS8P58	Paint Technology –IV	50	50	100	60	--	60	4
	Major Electives								
	B.Sc.PT MJS8P59 A	Paint Technology - V	50	50	100	60	--	60	4
	B.Sc.PT MJS8P59 B	Printing Ink Technology-II	50	50	100	60	--	60	4
	B.Sc.PT MJS8P59 C	Practical	100		100		60	60	4
	Ongoing Job Training (OJT)								
	B.Sc.PT MJS8P60		100		100	--	120	120	4
		Total	**325**	**225**	**550**	**270**	**180**	**330**	**22**

SEM. I

	Semester I	Total Hours	Session of3 hrs. each
	Major Mandatory		
B.Sc.PT MJS1P01	**INDUSTRIAL CHEMISTRY**		
	Aim and Objective ➢ To provide basic concept of elements, atomic structure, periodic tables. ➢ To provide bonding concepts like ionic bonding, covalent bonding etc ➢ To provide Acids, bases and various chemical reactions ➢ To provides fundamental to inorganic and organic chemistry concepts ➢ To provide water impurities and their purification methods		
	Learning Outcomes ➢ Understand the various elements, atomic structure in details ➢ Study the various chemical bonding involves in chemical reactions ➢ Study the aliphatic and aromatic compounds and their importance in chemical industries ➢ Study the various organic solvents, lubricants ➢ Study the various types of fuels and their calories values ➢ Study the various inorganic and organic functional groups.		
	Unit I		
	Introduction, Units and dimensions, elements, compounds, atoms, molecules	3	1
	Unit II		
	States of matter; solid, liquid and gases, valency, oxidation states	3	1
	Unit III		
	Chemical bonds (ionic, covalent, hydrogen bonds etc.), electro negativity, polarity, chemical reaction and balancingof equations	6	2
	Unit IV		
	Introduction to Acids, bases, mineral acids andsalts, pH, titrations, indicators, oxidation and reduction.	3	1
	Unit V		
	Define Molecular weight, Introduction of Organic Chemistry, Fundamentals etc.	3	1
	Unit VI		
	Introduction of Hydrocarbons: – Aliphatic, Aromatic, Oxygenated, Compounds, Oils, Amines, Isocyanates, etc. IUPAC nomenclature, structures and common names	6	1
	Unit VII		
	Important organic chemicals, solvents, lubricants, corrosion,	6	2

inhibitors, antioxidants, Stabilizers etc.		
Unit VIII		
Introduction to Inorganic compounds, functional groups and their relevance in paint industry.	6	2
Unit IX		
Fuels: Types of industrial fuels, calorific values and	6	2
efficiency of utilization of fuels. Products of combustion of fuels.		
Unit X	6	3
Quality of water supplies; nature of impurities present in water.		
Types of water - Deionization of Water, double distilled water etc. Purification and treatment of water.		
Unit XI: Modern Instrumental Methods of analysis –	12	4
UV-visible spectroscopy, IR spectroscopy and non- dispersive Raman spectroscopy, NMR Spectroscopy, Electron spin resonance spectroscopy, X-ray fluorescence, XRD		
Reference Books		
1. Chemistry of elements by N. N. Greenwood and A. Earnshaw, Pergammon 2. Instrumental methods of analysis by M. H. Willard, L. L. Merritt, J. A. Dean and F. F. Settle, 7th edition (1988). 3. Industrial Chemistry (including chemical engineering) B.K. Sharma - Goel publishing house, Meerut. 4. Pollution control in process industries - S. P. Mahajan - Tata McGraw-Hill Publishing Company Ltd., New Delhi. 5. Water pollution and management – C. K. Varashney - Wiley Eastern Ltd., Chennai - 20. 6. Instrumental Analysis, Douglas A. Skoog, F. James Holler & Stanley R. Crouch. 7. Instrumental Methods of Analysis, Willard, Merit and Dean Clayden, J., Greeves, N., Warren, S.; Organic Chemsitry; 2nd ed.; Oxford UniversityPress (2012)		

B.Sc. PT MJS1 P02	**UNIT OPERATIONS-I**		
	Aim and Objective ➢ The composition of paints and their industrial Operations. ➢ The different operations like mixing, agitation, Heat transfer. ➢ The drying, pulverization techniques.		
	Learning Outcomes ➢ To study various manufacturing process of pigments, resins and paints ➢ To understand the basics of information of paints mixing and dispersion. ➢ To study different Paint filtration, sludge, filtration process.		
	Unit I	6	2
	Industrial Operations, Systems in the manufacturing of Pigments, resins, and paints. 1) Natural pigments, synthetic organic & inorganic pigments, Extenders, Mica pigments & Aluminum pastes. 2) Synthetic resins like -Alkyd, Melamine formaldehyde & Acrylic resins 3) Solid paint, Metallic paint, stiff paint & powder coating		
	Unit II	9	3
	Different operations like dispersion, mixing, agitation, Heat transfer & exchange, filtration, drying, pulverization, dry & wet grinding, etc. Different processes -Osmosis, reverse osmosis, deionization & distillation, precipitation & crystallization.		
	Unit III	9	3
	Theory of filtration, Different types of filters, Absolute & nominal filters, Paint filtration, paint shop sludge generation & filtration & disposal– plate and frame filters, filter press. Rotary drum filter, Vacuum filtration, Basics of Cartridge Filtration, vibratory filter, sparkler filter, Ultra filtration, Filtration variables, Distinction between normal filtration & paint filtration.		
	Unit IV		
	Introduction to Fluid flow, Laminar-stream line flow, turbulent flow, Doughnut pattern for mill base premixing, thinning flow Pattern-Radial flow, Vertical flow, Horizontal flow, Reynolds number & Bernoulli equation about flow of liquids. Different types of fluids- ideal fluid, Real fluid etc.	6	2
	Reference Books		
	1. R. Norris Shreve, 1956, the chemical process industries, second edition, McGraw-Hill book company, Tokyo. 2. Rodger Talbert, 2008, Paints Technology Handbook, Taylor & Francis group, Boca Raton & New York & London. 3. R. Lambourne and T.A. Strivens, 1999, Paint and surface Coatings theory and practice, second edition, Woodhead Publishing Ltd, Cambridge 4. James R. Couper, W. Roy Penney, James R. Fair, and Stanley M. Walas, 2012,		

	Chemical Process Equipment Selection and Design, Third edition, Elsevier, united states of America. 5. Lyle F. Albright, 2009, Albright's Chemical Engineering Handbook, Taylor & Francis Group, Boca Raton & New York & London.

Open Elective (OE)			
B.Sc.PT S1P03	**INTRODUCTION TO PAINTS AND SURFACECOATINGS-I**		
	Aim and Objective ➢ The composition of paints and their classifications. ➢ The chemical modifications of fixed oils to enhance their properties. ➢ The composition and properties of driers. ➢ Various volatile solvents and their properties. ➢ Preparation and testing of modified oils.		
	Learning Outcomes ➢ Understand the composition and functions of Paints & Coatings ➢ Understand the composition and properties of various vegetable oils. ➢ Understand the compositions and properties of Polymer apply in coatings ➢ Understand the new development of Paints and coatings		
	Unit I	6	2
	History of Paints and Paint Industry.		
	Introduction to trends in surface coating & allied industry. To include trends in pigment , additives & sealants industry		
	Unit II		
	Classification of Surface Coatings.	6	2
	Unit III		
	Pigment, Extender, specific gravity, non-volatiles, VOC, Lacquer, varnish, viscosity, Rheology consistency.	6	2
	Unit IV		
	Binder – medium – vehicle.	6	2
	Unit V		
	Development of Paints and coatings – Introduction to Future trends.	6	2
	Reference Books		
	1. Organic Coating Technology, Volume I, by Henry Fleming Payne, John Wiley & Sons. 2. Basics of Paint Technology, Part I & II, by V.C. Malshe & Meenal Sikchi 3. Surface Coatings, Volume I, by OCCA Australia (Prepd.), Chapman and Hall 4. Outlines of Paint Technology, III Ed. By W. M. Morgans, Edward Arnold 5. Surface coatings: Science and Technology, by Swaraj Paul, John Wiley and Sons		

Open Elective (OE)			
B.Sc.PT S1P04A	**INTRODUCTION TO PAINTS AND SURFACECOATINGS-II**		
	Aim and Objective ➢ The chemical modifications of fixed oils to enhance their properties. ➢ The composition and properties of driers. ➢ Preparation and testing of modified oils.		
	Learning Outcomes ➢ Understand the composition and properties of various vegetable oils. ➢ Understand the compositions and properties of Polymer apply in coatings ➢ Understand the new development of Paints and coatings		
	Unit I		
	Drying oils – constitution of oils; properties of oils like-	12	4
	saponification value, Iodine value etc.		
	Unit II		
	Introduction to Extraction of oils and Treated oils.	6	2
	Unit III		
	Introduction to Polymer, functionality, Degree of polymerization, Minimum film formation, glass transition temperature. Basics Plastic polymer Technology	12	4
	Reference Books		
	1. Organic Coating Technology, Volume I, by Henry Fleming Payne, John Wiley & Sons. 2. Basics of Paint Technology, Part I & II, by V.C. Malshe & Meenal Sikchi 3. Surface Coatings, Volume I, by OCCA Australia (Prepd.), Chapman and Hall 4. Outlines of Paint Technology, III Ed. By W. M. Morgans, Edward Arnold Surface coatings: Science and Technology, by Swaraj Paul, John Wiley and Sons		

B.Sc.PT S1P04B	**Unit Operation-II**		
	Aim and Objective ➢ The composition of paints and their industrial Operations. ➢ The different operations like mixing, agitation, Heat transfer. ➢ The drying, pulverization techniques.		
	Learning Outcomes ➢ To study various manufacturing process of pigments, resins and paints ➢ To understand the basics of information of paints mixing and dispersion. ➢ To study different Paint filtration, sludge, filtration process.		
	Unit I	6	
	Basic Rheology concept & it's application in paint manufacturing & application covering Architectural, industrial coatings & sealants		
	Unit II	15	
	Types & classification of pumps, their working & application Dynamic & positive displacement pumps Dynamic Pumps-Centrifugal, Vertical centrifugal, Horizontal centrifugal, submersible, fire hydrant Positive displacement Pumps-Diaphragm, Gear, Lobe & piston Pumps used in paint manufacturing & application- paint Mix room & various paint & sealant application processes.		
	Unit III	9	
	Handling & Transfer of solvents, resins, oils, pigments, and other ingredients. Precautions while transfer, handling flammable raw materials, details about static electricity, gravity flow layout of paint manufacturing unit & its benefits etc.		
	Reference books		
	1. R. Norris Shreve, 1956, the chemical process industries, second edition, McGraw-Hill book company, Tokyo. 2. Rodger Talbert, 2008, Paints Technology Handbook, Taylor & Francis group, Boca Raton & New York & London. 3. R. Lambourne and T.A. Strivens, 1999, Paint and surface Coatings theory and practice, second edition, Woodhead Publishing Ltd, Cambridge		
B.Sc.PT S1P04C	**CONSTRUCTION ENGINEERING-I**		
	Aim and Objective ➢ To introduce the forms of buildings. ➢ To provide a general understanding on main Principles in construction. ➢ To classified Common faults, defects in buildings ➢ 4. To create awareness about building materials and their uses.		
	Learning Outcomes		

	➢ To understand the types of buildings structures ➢ To study various raw materials used in construction in buildings ➢ To study how basic principles of constructions ➢ To study the various defects in building		
	Unit I	6	2
	Different forms of buildings and Introduction to main Principles in		
	construction		
	Unit II	6	2
	Elements of building, function of each element, building		
	materials and their uses.		
	Unit III	6	2
	Introduction to Common faults, defects in buildings.		
	Unit IV	6	2
	Aesthetic principles relating to the interior and exterior		
	appearance of the building.		
	Unit V	6	2
	Basic Engineering drawings, Plans and Elevation of Solids.		
	Reference Books		
	1. Construction Planning Methods & Equipment: Puerifoy –Tata MC Graw Hill 2. Construction Equipments & its Management: S.C Sharma, Khanna Publication		
B.Sc.PT S1P04D	**CONSTRUCTION ENGINEERING-II**		
	Aim and Objective ➢ To introduce the forms of buildings. ➢ To provide a general understanding on main Principles in construction. ➢ To classified Common faults, defects in buildings ➢ 4. To create awareness about building materials and their uses.		
	Learning Outcomes ➢ To understand the types of buildings structures ➢ To study various raw materials used in construction in buildings ➢ To study how basic principles of constructions ➢ To study the various defects in building		
	Unit I	9	3
	Scales of Drawings, Recognition of various Engineering		

	Drawings.		
	Unit II	6	2
	Sealing, Plastering, and Surface preparation.		
	Unit III	15	5
	Structure of Building •Construction Techniques •Plan of building and room structure (Calculations of floor plate, ceiling and walls) •Wall surface calculations and basic paints details used.		
	Reference Books		
	1. Construction Planning Methods & Equipment: Puerifoy –Tata MC Graw Hill 2. Construction Equipments & its Management: S.C Sharma, Khanna Publication		
	Vocational Courses (VC)		
B.Sc.PT S1P5	**Computer Lab/IT**		
	Unit I	3	1
	Elements of LAN, WAN		
	Unit II	3	1
	Microsoft Windows		
	Unit III	6	2
	Office: Word, Excel, Advanced Word, Excel, Power Point		
	Unit IV	9	3
	Internet Browsing, Information on Programming Languages		
	and Operating Systems, DBMS.		
	Unit V	6	2
	PC Hardware Selection. Laptops, Client Server		
	Unit VII	3	1
	Management Information Systems		
	Skill Enhancement Courses (SEC)		

B.Sc.PT S1P06	**PRACTICALS**	**60**	**3**
	1. To determine Bulk density of a powder sample.		
	2. To determine oil absorption of pigment/extender.		
	3. To find out density of liquid water and turpentine.		
	4. To determine specific gravity of pigment / extender		
	5. To determine % volatile matter of pigments andextenders.		
	6. Solubility Product and Precipitation.		
	7. To observe appearance of pigments and extenders		

Ability Enhancement Courses (AEC)			
B.Sc.PT S1P07	**COMMUNICATION SKILLS - I**		
	Aim and Objective ➢ To introduce the basic English grammar. ➢ To provide a general understanding the process of communication. ➢ To classified various ways of communications ➢ To enhanced the transmission and Listening ability		
	Learning Outcomes ➢ Understand the various techniques of writing effectively and write professional statements & organizational communications ➢ Develop writing skills by applying different strategies on organization system ➢ Will write articles, reports, projects and different organizational proposals differently and efficiently. ➢ Write in concise with brevity and coherency all the messages of the organization.		
	Unit I	6	2
	Basic English, general grammar, construction of sentences,		
	punctuations, comprehension, etc.		
	Unit II	6	2
	Introduction to Communication, Elements and Process of		
	Communication.		
	Unit III	6	2
	Audience analysis, message and situation analysis.		
	Unit IV	6	2
	Barriers to effective communication,		
	Interpersonal, intra-group and inter-group Communication.		
	Unit V	6	2
	Transmission, Listening, Elements and process of listening.		
	Strategies for effective listening. Barriers to listening.		
	Reference Books		
	1. Das, B K and A David, 'A Remedial Course in English for Colleges', (Book -1,2,3) Oxford University Press, New Delhi. 2. Sinha, R P, 'Current English Grammar and Usage with Composition', Oxford University Press, New Delhi. 3. Wren, P C & Martin, 'English Grammar and Composition', S Chand & Co Ltd. New Delhi. 4. A. S. Horne, Guide to Pattern and usage in English, Oxford University Press, N.D. M.L. Tickoo& A. E. Subramanian, Intermediate Grammar, usage & composition,Orient Longman		

Value Education Course (VEC)			
B.Sc.PT S1P08	**Green Audit-I**		
	Aim and Objective ➢ To introduce the fundamental concepts of environment. ➢ To provide a general understanding on environmental chemistry. ➢ To classified the various types of pollutions		
	Learning Outcomes ➢ To help understand the importance of an environment ➢ To familiarize students about environment importance ➢ To create awareness of various environmental pollutions ➢ To provide understanding of environmental remediation		
	Unit I		
	Environmental Chemistry	15	5
	Concept and scope of Environmental Chemistry		
	Atomic structure, electronic configuration, Classification of elements, mole concept, molarity and normality, quantitative volumetric analysis		
	Chemistry of water, alkalinity and acidity of water, hardness of water, concept of DO, BOD, and COD. Heavy metals, metal solubility, complexation and chelation		
	Wastewater treatment: Primary, Secondary and tertiary treatments. Advanced water treatment techniques, redox potential.		
	Unit II		
	Environmental Pollution	15	5
	Atmospheric pollution		
	Water pollution		
	Soil pollution		
	Hazardous solid wastes		
	Reference Books		
	1. A. K. De. (3rd Ed). 2008 Environmental Chemistry. New Age Publications India Ltd. 2. I. C. Shaw and J. Chadwick. 1997. Principles of Environmental Toxicology. Taylor& Francis Ltd. 3. S.C. Santra. 2011. Environmental Science. New Central Book Agency.		

	4. Ira. S. Richards. 2008. Principles and Practices of Toxicology in Public Health. Jones and Barlett Publications. 5. B.R. Gurjar, C.S.P. Ojha and L.T. Molina. 2010. Air Pollution-Health and Environmental Impacts. CRC Press. 6. J.S. Jean, J. Bundschuh and P. Bhattacharya. 2011. Arsenic in Geosphere and Human Diseases. CRC Press. 7. I.L. Pepper, C.P. Gerba and M.L. Bresseau. 2006. Environment and Pollution Science. Academic Press.		
Indian Knowledge System (IKS)			
B.Sc.PT S1P09	**Indian Painting System**		
	Aim and Objective ➢ To introduce the ancient concepts of Indian paint history. ➢ To provide a general understanding on paint ingredients used in ancient time. ➢ To classified various Indian Paintings systems in all periods. ➢ To create awareness about modern Indian paint systems		
	Learning Outcomes ➢ To understand the history of painting process and raw materials ➢ To study various periods painting methods in Indian history ➢ To study how prehistoric painting developed in India ➢ To study the role of natural raw materials in painting systems ➢ To study the modern Indian painting systems		
	Unit I	15	5
	Introduction to IKS: Bharatavarsha, Literature of Indian Civilisation, Indian Astronomy, Indian Health Sciences, Classical Literature, Indian Education, Indian Architecture and Town Planning, Indian Fine Arts, Indian Agriculture, Indian Metallurgy, Indian Textiles		
	Unit II	15	5
	Indian Paintings in Ancient Age		
	Background, Materials used in the paintings, Prehistoric Paintings, Mural Paintings in India, Miniature Paintings, Folk Painting, Modern Indian Painting System		
	Reference Books		
	1. Kritzon C. How to paint a mammoth. Bull. Primitive Technol. 2002;24. 2. Doerner M. The materials of the artist. Harcourt-Brace; 1984 3. Ames J. Color theory made easy. New York: Watson-Guptill Publications; 1996. 4. The theory of Indian Painting systems by Isabella Nardi		
Co-curricular Courses (CC)			
B.Sc.PT S1P010	**Health and Wellness**		

	Aim and Objective ➢ To introduce the fundamental concepts of physical education, health and fitness. ➢ To provide a general understanding on nutrition, first aid and stress management. ➢ To familiarize the students regarding yoga and other activities for developing fitness. ➢ To create awareness regarding hypo-kinetic diseases, and various measures of fitness and health assessment.		
	Learning Outcomes ➢ To help understand the importance of a healthy lifestyle ➢ To familiarize students about physical and mental health ➢ To create awareness of various life style related diseases ➢ To provide understanding of stress management ➢ Modern concept of Health, Physical fitness and Wellness		
	Unit I: Introduction to health & wellness	15	5
	➢ Define and differentiate health and wellness		
	➢ Importance of health and wellness Education.		
	➢ Local, demographic, societal issues and factors affecting health and wellness.		
	➢ Diet and nutrition for health & wellness.		
	➢ Essential components of balanced diet for healthy living with specific reference to the role of carbohydrates, proteins, fats, vitamins & minerals.		
	➢ Malnutrition, under nutrition and over nutrition.		
	➢ Processed foods and unhealthy eating habits.		
	➢ Body systems and common diseases.		
	➢ Sedentary lifestyle and its risk of disease.		
	➢ Stress, anxiety, and depression.		
	➢ Factors affecting mental health.		
	➢ Identification of suicidal tendencies.		
	➢ Substance abuse (Drugs, Cigarette, Alcohol), de-addiction, counselling and rehabilitation		
	Unit II: Management of health and wellness	15	5
	➢ Healthy foods for prevention and progression of Cancer, Hypertension, Cardiovascular, and metabolic diseases (Obesity, Diabetes, Polycystic Ovarian Syndrome).		
	➢ Types of Physical Fitness and its Health benefits.		
	➢ Modern lifestyle and hypo-kinetic diseases; prevention and management through exercise.		
	➢ Postural deformities and corrective measures.		
	➢ Spirituality and mental health.		
	➢ Role of Yoga, asanas and meditation in maintaining health and wellness.		

	➢ Role of sleep in maintenance of physical and mental health.		
	Reference Books		
	1. Physical Activity and Health by Claude Bouchard, Steven N. Blair, William L. Haskell. 2. Mental Health Workbook by Emily Attached & Marzia Fernandez, 2021. 3. Mental Health Workbook for Women: Exercises to Transform Negative Thoughts and Improve Well- Being by Nashay Lorick, 2022 4. Lifestyle Diseases: Lifestyle Disease Management, by C. Nyambichu & Jeff Lumiri, 2018. 5. Physical Activity and Mental Health by Angela Clow & Sarah Edmunds, 2013.		

SEM.II

	SEMESTER II	Total Hours	Session of 3 hrs each
Major Mandatory			
B.Sc.PT MJS1P10	**PIGMENTS, SOLVENTS AND ADDITIVES**		
	Aim and Objective ➢ To understand corrosion inhibitors, driers and additives used for special functions in paints ➢ To understand various properties of pigment and extender. ➢ To understand basics of colour and colour- mixing. ➢ To understand manufacturing of Classical Azo pigments and dyes. ➢ To understand manufacturing of inorganic pigment. ➢ To understand various types of paint additives used ➢ To understand Wetting & dispersing agents, defoamers and adhesion promoters used in paints. ➢ To understand biocides and heat stabilizers		
	Learning Outcomes ➢ Understand the various properties of pigments and extenders and determine them by analytical methods ➢ Study the manufacturing processes of inorganic prime pigments ➢ Prepare extender pigments and study their properties and applications ➢ Study the manufacturing processes of organic prime pigments ➢ Study the manufacturing processes and determine various properties of azo pigments ➢ Understand various additives used in paints. ➢ Understand general characteristics of solvents		
	Unit I	9	3
	Pigments: Definition, classification of pigments, forms of colourants, selection criteria of pigments, colour and structure of pigments, properties of pigments, toxicity of pigments etc. Nano-pigments.		
	Unit II	12	4
	Inorganic pigments: TiO_2, Prussian Blue, Iron Oxide, Chrome		
	Pigments, Carbon Black, Metallic pigments, anti-corrosive pigments, Extenders - $CaCO_3$, $BaSO_4$, Silicates etc. Zinc Oxide, White Lead etc. Basics about Aluminum pastes (Coated & normal) types-Leafing & non leafing		
	Unit III	6	2
	Introduction to Organic Pigments, Important parameters in the manufacturing of organic pigments.		
	Unit IV	9	3
	Introduction to raw materials, preparation of Toluidine Reds, Hansa Yellow, Benzidine Yellow, Phthalocyanines, High Performance Pigments (inorganic and organic).		
	Unit V	12	4
	Solvents: Classification of solvents, Properties of Solvents, Selection criteria of solvents.		

	Introduction to Solvent power, Solvent Index, Rate of Evaporation of Solvents, Thinners, Diluents, Dilution Ratio.		
	Unit VI	12	4
	Additives: Definition, Dryers, levelling agents anti-skinning agents, wetting and dispersing agents, anti-settling agents, anti-foaming agents, anti-sagging, biocides (bactericides and fungicides), UV Light stabilizers etc.		
	Reference Books		
	1. Pigment Hand book Vol. I, II and III by T. C. Patton. 2. Basics of Paint Technology, Part I & II, by V.C. Malshe & Meenal Sikchi. 3. Pigments, dyestuffs and Lakes, part six, Paint Technology Manuals. 4. Organic Coating Technology Vol. I & II by H. F. Payne.		

B.Sc.PT MJS1P11	**RESIN TECHNOLOGY - I**		
	Aim and Objective ➢ The objective of this course is to educate the students about properties of natural resins ➢ Characterization (testing and evaluation) of properties of resins. ➢ Manufacturing of Natural and Synthetic resins ➢ Understand safety rule and regulation for resins. ➢ Manufacturing process and application impact and health hazards study of resins.		
	Learning Outcomes ➢ Study rosin and shellac and modify them for use in surface coatings ➢ Physical and chemical examination of natural resins and their modifications ➢ Chemistry and raw materials synthetic resins.		
	Unit I	9	3
	Definition of Oils, Classification of oils, properties of Oils, Linseed, Soyabean, Tung Oil, Dehydrated Castor Oil (DCO), Treated Oils, Modification of Oils, Stand Oils – Application.		
	Unit II	6	2
	Introduction to Natural Resins: Classification of Natural Resin, Rosin, Ester gum, shellac – their Application.		
	Unit III	15	5
	Introduction to Synthetic Resins: Chemistry, Raw Materials for manufacture, Process of manufacturing. Properties and Application of synthetic resins.		
	Reference Books		
	1. Organic Coating Technology, Volume I; by Henry Fleming Payne, John Wiley & Sons. 2. Surface Coatings, Volume I; by OCCA Australia (Prepd.), Chapman and Hall 3. Basics of Paint Technology, Part I & II, by V. C. Malshe & Meenal Sikchi. 4. Modern Surface Coatings, by P. Nylon and E. Sunderland. 5. Outlines of Paint Technology, III Ed.; by W. M. Morgans, Edward Arnold		

	Minor		
B.Sc.PT S1P13	**DECORATIVE PAINTS-I**		
	Aim and Objective ➢ To understand the basic concepts decorative paints. ➢ To understand Classification of decorative paints. ➢ To understand the various raw materials used for decorative paints ➢ To understand the acrylic distemper, acrylic emulsion and their importance.		
	Learning Outcomes ➢ Understand the basic concepts about interior, exterior paintings and functions of ingredients ➢ Understand the different types of distempers and their classifications ➢ Learn the importance and usage of strainers. ➢ Learn the solvent based and water based thinner		
	Unit I	9	3
	The classification of solvent based, water based, Glossy, semi glossy, eggshell, matt etc, Metallic, stencil & many other interior & exterior finishes to be covered. Pre requisites & properties of all types of interior & exterior coatings. advantages & disadvantages etc.		
	Unit II	12	4
	Dust proof coatings, cool paint / heat insulating coatings etc. Powder Distemper, Oil bound distemper, acrylic distemper, acrylic emulsion and premium emulsion, Enamel paint and texture finishes etc.		
	Unit III	6	2
	Aqueous pastes & universal tinters including formulatory concept. Their use in UTS system & importance of their dispersion & stability & viscosity/ rheology.		
	Unit IV	3	1
	Paint system, Primer, alkali resistance primer – Primer surfacers and Top Coat.		
	Reference Books		
	1. The Selection of Decorative Paints. In: Surface Coatings. Springer, Dordrecht. https://doi.org/10.1007/978-94-010-9810-6_20 2. Complete Book of Decorative Paint Techniques. Hardcover – Import, 10 May 1994 3. Handbook of Paint Raw Materials Hardcover – Import, 31 December 1989 4. Handbook of Paint Raw Materials Hardcover – 1 April 1982		

	Open Elective (OE)		
B.Sc.PT S1P14	**BASIC PAINT MANUFCTURING-I**		
	Aim and Objective ➢ The role and dosage of additives and principles of coating formulation. ➢ The Pigment-Binder geometry, PVC and CPVC of paints. ➢ The principles of coating manufacture. ➢ The production planning, safety and health hazards, related to paint manufacture.		
	Learning Outcomes ➢ Study various additives and their application in surface coatings. Formulate coatings for various application ➢ Study the principles of coating manufacture and their applications ➢ Study various equipment and machinery used in paint manufacture, their selection, calculations involved in efficient operation, economic considerations, etc. ➢ Production planning and Factory layout. ➢ Apply knowledge of properties of all the raw materials for formulating and preparing different types of paints. Apply paints by various methods		
	Unit I	12	3
	Principles of paint formulations. Typical formulations of dry distempers, cement Paints and skim coats. Typical formulations of solvent base Primers, Undercoats, Intermediate coats and Finish coats. Typical formulations of water base Primers, Acrylic washable distempers, Plastic emulsion Paints Interiors & Exteriors.		
	Unit II	12	4
	Inputs and information to formulation, Rheology, Viscosity		
	and flow properties, Oil absorption, Pigment volume		
	concentration (PVC) and critical Pigment volume		
	concentration (CPVC), Variation in the properties of coatings with change` in PVC.		
	Calculations related to mill void, RPM, charging volume etc. All basic paint calculations viz. 1) Theo. Solids 2) Theo. Specific Gravity 3) Volume solids 4) P/B Ratio 5) Theo. Covering capacity etc.6) CPVC 7) Sub critical & super critical formulation		
	Unit IV	6	2
	Dispersion equipment/machinery.		
B.Sc.PT S1P15A	**BASIC PAINT MANUFCTURING-II**		
	Unit I	15	5

	Steps in Paint manufacturing, Phenomenon of Mixing, Soaking, wetting, grinding, dispersion and stabilization. Dispersion processes, Daniel wet & flow point, Composition of grinding vehicle, Classification of grinding, important considerations in pigment dispersion and stabilization. Types of mills recommended for specific type of paints Grinding slurry calculations Importance of mill base vsicosity & specific gravity Process control parameters while dispersion		
	Unit II	15	5
	Heavy duty mixtures, double blade mixers, sigma mixture, Ball Mill, Pug Mills, Sand Mill (advantages a& disadvantages of sand mill), edge runner roller mills, Hammer mills, jet mills, Double and Triple Roll Mills, Attritors etc. Ball and Pebble mills: Advantages & disadvantages, physical factors affecting the performance of ball mill, critical & optimum speed of ball mill.		
	Reference Books		
	1. Organic Coating Technology, Vol. I & II, By: H. F. Payne 2. Outlines of Paint Technology, By: W. M. Morgan 3. Basics of Paint Technology, Part I & II, by V. C. Malshe & Meenal Sikchi 4. Surface Coatings, Volume I & II; by OCCA Australia 5. The chemistry of organic film-formers, by D. H. Solomon, R.E. Krieger Pub. 6. Introduction to paint chemistry; by G.P.A. Turner, Chapman and Hall Paint and surface coating theory and practical II edition R. Lam Bournee and TAStriven		
B.Sc.PT S2P15B	**Advanced Resin Technology**		
	Aim and Objective ➢ The objective of this course is to educate the students about properties of natural resins ➢ Characterization (testing and evaluation) of properties of resins. ➢ Manufacturing of Natural and Synthetic resins ➢ Understand safety rule and regulation for resins. ➢ Manufacturing process and application impact and health hazards study of resins.		
	Learning Outcomes ➢ Study rosin and shellac and modify them for use in surface coatings ➢ Physical and chemical examination of natural resins and their modifications ➢ Chemistry and raw materials synthetic resins.		
	Unit I	9	3
	Introduction to Alkyds, Modified Alkyds, Classifications of alkyds oils, Long Oil, Medium Oil and short oils alkyds.		
	Unit II	9	3
	Introduction to Saturated and unsaturated polyesters resins,phenolic resins, amino resins, urea formaldehyde (UF) and melamine formaldehyde (MF)		
	Unit III	12	4
	Various types of chemical reaction involved in resin synthesis		

B.Sc.PT S2P15C	**Decorative Paints-II**		
	Aim and Objective ➢ To understand the basic concepts decorative paints. ➢ To understand Classification of decorative paints. ➢ To understand the various raw materials used for decorative paints ➢ To understand the acrylic distemper, acrylic emulsion and their importance.		
	Learning Outcomes ➢ Understand the basic concepts about interior, exterior paintings and functions of ingredients ➢ Understand the different types of distempers and their classifications ➢ Learn the importance and usage of strainers. ➢ Learn the solvent based and water based thinner		
	Unit I	6	2
	Dust proof coatings, cool paint / heat insulating coatings etc. Polymers used in these types of paints, concept of emulsion binder to be explained well. Various additives used & their role, film formation mechanism. Basic properties of paints like wash ability etc..		
	Unit II	3	1
	Green building concept, GS 11- 2008, green engineering and green chemistry principles in paint formulation. VOC and its calculation as per BIS and ASTM. International initiatives updates on green paints.		
	Unit III	12	4
	Architectural Coating Systems: primer-surfacer/ surfacer, undercoats, putties, sound deadeners, under seal. decorative/ tradesale/architectural paints: sealers for wood, plasters, primers, surfacers, flat oil paints, synthetic enamels. water based coatings: lime wash, lime colours, dry distempers, cement paint, oxide floor colours, skim coats, water thinnable primers, oil bound distempers, acrylic washable distempers. Plastic emulsion paints: interior and exteriors; properties and uses.		
	Unit V	9	2
	Eco-Friendly Coatings: -: designing, mechanism, application and merits & demarits coatings. high solids coatings: considerations, influence of solvents, temperature, pigments, additives, cross-linkers etc. radiation curable coatings: types of radiations, UV curing, fundamental of photopolymerisation, photo-initiators, photo sensitizers, oligomers, monomers, problems associated with RADC uses / areas of application of EB curing and other curing systems. URE cure systems, electron beam curing: EB generators, factors affecting EB generation and curing,		
	Reference Books		
	5. The Selection of Decorative Paints. In: Surface Coatings. Springer, Dordrecht. https://doi.org/10.1007/978-94-010-9810-6_20 6. Complete Book of Decorative Paint Techniques. Hardcover – Import, 10 May 1994 7. Handbook of Paint Raw Materials Hardcover – Import, 31 December 1989 Handbook of Paint Raw Materials Hardcover – 1 April 1982		

B.Sc.PT S2P15D	**Basic Paint Application-I**		
	Aim and Objective ➢ The objective of this course is to enable the students understand and apply ➢ Different contaminants and their removal from different surfaces. ➢ Chemical pretreatment and different chemical conversion coatings ➢ Different paint application techniques ➢ Different paint and paint film defects and remedies to overcome them.		
	Learning Outcomes ➢ Understand the different methods of preparing surfaces for painting. ➢ Apply the knowledge of pretreatment methods to ferrous and non-ferrous substrates. ➢ Learn about various methods of application of paints. ➢ Analyze various paint defects and take remedial actions to overcome the same. ➢ Apply knowledge of paint application by brush, spray and powder coating.		
	Unit I	12	4
	Objectives of surface preparation, surface preparation methods: hand cleaning, power cleaning, flame cleaning, abrasive blasting; classification, selection & equipment, BS and ISO standards chemical cleaning: solvent, acidic, alkaline, emulsion cleaning equipment for surface preparation: immersion, vapour, wiping & spray, operating conditions, bath analysis & control. Surface preparation for new & previously painted surfaces. Surface preparation methods for plastic substrates, wood & masonry, and cementitious surfaces.		
	Unit II	12	4
	Importance of putties, water proofing chemicals, crack		
	filling and Plaster of Paris, painting process for freshly plastered & old plaster surfaces, importance of biocidal wash, plastering requirements etc. Explain the various application methods with their advantages and limitations, Brushing, roller coating and spraying, Type of brushes and rollers – selection criteria, guidelines for applications.		
	Unit III	6	2
	Requirement of paint for different end applications, methods of application like, dilution ratios and good work practice, Masking and cleaning measures.		
	Reference Books		
	1. Good painting practices vol. 1 by Joseph Bigos 2. Surface Coatings, Vol. I & II; by: OCCA, Australia 3. Outlines of Paint Technology; by: W. M. Morgan 4. Surface Coating Technology; by: Swaraj Paul Basics of Paint Technology (Part II); by: Malshe & Sikchi		
B.Sc.PT	**Basic Paint Application-II**		

S2P15E			
	Unit I	6	2
	Advances in methods of application & film formation of surface coatings		
	Tools and equipment required, care and maintenance of		
	equipment, Painter kits, Painting procedures. Do's and		
	Don'ts for better paint application.		
	Unit III	9	3
	Fundamentals of colour, primary & secondary colours , concept of Delta E, Metamerism, shade matching, tint, shade & tone etc. Mass tone, undertone, Hue, chroma & value, colour blindness, effect of light on colour etc. Various colour schemes for interior & exterior		
	Unit IV	6	2
	Paint shop services, paint defect and paint remover: Paint shop troubles inspection and services. Paint defects: classification, causes & remedies, paint and varnish removers: solvent & chemical paint removers, mechanism, methods.		
	Unit II	9	3
	Coating application methods: Architectural paint application: Brush, roller **Industrial Paint application**: Spray methods- air-assisted spray, airless spray, air-assisted airless spray, high volume low-pressure spray, multi-component guns, electrostatic spray, transfer efficiency, dual feed spray, paint circulation system, spray booth, Bell application, robot painting,		
	Reference Books		
	5. Good painting practices vol. 1 by Joseph Bigos 6. Surface Coatings, Vol. I & II; by: OCCA, Australia 7. Outlines of Paint Technology; by: W. M. Morgan 8. Surface Coating Technology; by: Swaraj Paul Basics of Paint Technology (Part II); by: Malshe & Sikchi		
Vocational Courses (VC)			
B.Sc.PT S2P16	**Paint Application Technique-I**		
	Aim and Objective ➢ To understand the basic concepts various substrates for paint application. ➢ To understand Impurities on the surface. ➢ To understand the different pretreatment process. ➢ To understand the various methods like Batch, Semi-automatic and automatic processes		
	Learning Outcomes ➢ Understand the basic concepts metal, wood, paper and plastics substrates. ➢ Understand the Different pretreatment process. ➢ Learn the phosphating process and their types. ➢ Understand about surface preparation and application of paints on various		

	surfaces.		
	Unit I	6	2
	Introduction to various substrates for paint application like metal, plastics, wood, paper, glass, concrete etc.		
	Unit II	12	4
	Impurities on the surface: ferrous metal substrate and non-ferrous metal substrate, surface preparation, pre-treatment,		
	Methods of pre-treatment, Different processes		
	like degreasing, de-rusting, pickling; compositions, operating conditions, phosphating. Phosphate coatings; classification, advantages & dis advantages. Nanotechnology in surface treatment, eco-friendly insitu phosphating, chromate conversion coating: classification, coating process.; rinsing, accelerator, and passivation		
	Unit III	12	4
	Automation in the Paint Application, Painting Robot, Atomizer, Paint Color Changer, Paint Dosing Technology for Liquid Paints, Paint Supply Systems for the Industrial Sector, Paint Mixing Room, Circulation Line System, Supply Systems for Special Colors, Voltage Block Systems with Color-Change Possibility, sealing and underbody protection in automobiles		
	Reference Books		
	1. Organic Coating Technology, Vol. I & II; by H. F. Payne. 2. Outlines of Paint Technology; by W. M. Morgan. 3. Surface Coatings, Vol. I & II; by OCCA, Australia. Basics of Paint Technology (Part I & II); by Malshe & Sikchi		
Skill Enhancement Courses (SEC)			
B.Sc.PT S2P17	**Paint Application Technique-II**		
	Unit I	15	5
	Different Industrial paint application techniques – spraying, conventional, airless, electrostatic and hot spraying, Roller coating (coil coating), dip coating, flow coating, curtain coating, dip spin coating, calender coating, knife coating, silk-screen, tumbling etc.		
	Unit II	15	5
	Powder coating application: fluidized bed, electrostatic fluidized bed, electrostatic powder spray Electrodeposition: anodic/ cathodic deposition, commercial ED installation, throwing power, bath control, ultra-filtration, variables, advantages & disadvantages, bath parameters, line monitoring, common paint film defects in CED. Plasma coating, chemical vapour deposition, physical vapour deposition, auto deposition		
	Reference Books		
	4. Organic Coating Technology, Vol. I & II; by H. F. Payne.		

	5. Outlines of Paint Technology; by W. M. Morgan. 6. Surface Coatings, Vol. I & II; by OCCA, Australia. Basics of Paint Technology (Part I & II); by Malshe & Sikchi		
Ability Enhancement Courses (AEC)			
B.Sc.PT S2P18	**Communication Skills - II**		
	Aim and Objective ➢ To understand the basic concepts of interview. ➢ To understand Written communication. ➢ To understand the different Business Letter Writing. ➢ To understand the Presentation skills		
	Learning Outcomes ➢ Understand the basics of technical communication. ➢ Developing the skills of variety of the words like synonyms and writing skills. ➢ Draft a business letters and resume for to develop for industry. ➢ Explore the body language for perfect professional presentation. ➢ Present themselves effectively and in a confident manner in the contemporary competitive market.		
	Unit I	6	2
	Interviews and Group Discussions.		
	Unit II	6	2
	Written communication, Memos, Reports – defining a		
	problem, developing objectives and options.		
	Unit III	6	2
	Business Letter Writing, Elements and Principle,		
	Communication in the role of a supervisor, feedback,		
	maintaining log-book.		
	Unit IV	6	2
	Written Analysis clarity and style.		
	Unit V	6	2
	Briefing of reports, articles and other documents.		
	Presentation skills – Public Speaking.		
	Reference Books		
	1. Effective Technical Communication, by Barun K. Mitra, Oxford University Press 2. Business Correspondence & Report Writing by R.C. Sharma & Krishna Mohan, Tata McGraw Hill, N.D. 3. Developing Communication Skills by Krishna Mohan & Meera Banerjee, Macmillan India 4. 'Technical Communication- Principles and Practices' by M R S Sharma, Oxford University Press, New Delhi		

Value Education Course (VEC)			
B.Sc.PT S2P19	**Green Audit-II**		
	Aim and Objective ➢ The objective of carrying out Green Audit is securing the environment and cut down the threats posed to human health. ➢ To make sure that rules and regulations are taken care of. ➢ To avoid the interruptions in environment that are more difficult to handle and their correction requires high cost. ➢ To suggest the best protocols for adding to sustainable development.		
	Learning Outcomes ➢ It would help to shield the environment. ➢ Recognize the cost saving methods through waste minimizing and managing ➢ Point out the prevailing and forthcoming complications. ➢ Authenticate conformity with the implemented laws. ➢ Empower the organizations to frame a better environmental performance. ➢ It portrays a good image of a company which helps building better relationships with the group of stakeholders. ➢ Enhance the alertness for environmental guidelines and duties.		
	Unit-I		
	Introduction about green Audit	3	1
	Unit-II		
	Pre-audit stage	6	2
	Scope and goals of green Auditing, Benefits of green auditing		
	Target areas of green auditing: Auditing for green campus management, Auditing for carbon footprint		
	Methodology of green auditing, survey form		
	Unit-III		
	Audit stage	3	1
	Comments on the site tour, review of documents and records		
	Review of policies, Interviews and site inspection		
	Unit-IV		
	Post Audit stage	3	1
	Key findings and observations		
	Evaluation of audit findings, Consolidation of audit findings		
	Conclusion and full list of recommendations		
	Exit meeting		
	Unit-V		
	Practical/Assignments works	15	
Co-curricular Courses (CC)			

B.Sc.PT S2P20	**Practical**	60	
	1. To determine viscosity of liquid paints on flow cup B4		
	2. Weight per litre of a paint using weight per litre cup.		
	3. To determine % non-volatile matter of paints.		
	4. To check finish on Hegman Guage		
	5. Drawdown of the paint on various substrates.		
	6. To find out normality of a given acid solution.		
	7. To study the pH of given liquid / solutions.		
	8. To apply coating on wooden surface.		
	Reference book		
	1. Organic Coating Technology, Volume 1 & 2 By Henry Fleming Payne 2. Outlines of Paint Technology 3rd Edition by W. M. Morgans Polymer Sewer		

PASSING PERFORMANCE GRADING :
The Performance Grading of the learner shall be on ten point scale be adopted uniformly.

Letter Grades and Grade Point

Semester GPA/ Program CGPA Semester / Program	% of Marks	Alpha-Sign/Letter Grade Result	Grading Point
9.00 – 10.00	90.0 - 100	O (Outstanding)	10
8.00 - < 9.00	80.0 < 90.0	A+ (Excellent)	9
7.00 - < 8.00	70.0 < 80.0	A (Very Good)	8
6.00 - < 7.00	60.0 < 70.0	B+ (Good)	7
5.50 - < 6.00	55.0 < 60.0	B (Average)	6
5.00 - < 5.50	50.0 < 55.0	C (Pass)	5
Below 5.00	Below 50	F (Fail)	0
AB (Absent)		Absent	

NOTE : VC : Vocational Courses, SEC : Skill Enhancement Courses, AEC : Ability Enhancement Courses, VEC : Value Education Courses, VSC : Vocational Skill Course, IKS : Indian Knowledge System, OJT: On The Job Training, FP: Field Projects.

The performance grading shall be based on the aggregate performance of Internal Assessment and Semester End Examination.

The Semester Grade Point Average (SGPA) will be calculated in the following manner:SGPA = □CG / □C for a semester, where C is Credit Point and G is Grade Point for the Course/ Subject.

The Cumulative Grade Point Average (CGPA) will be calculated in the following manner: CGPA = □CG / □C for all semesters taken together.

PASSING STANDARD FOR ALL COURSES :

Passing 50% in each subject /Course separate Progressive Evaluation (PE)/Internal Evaluation and Semester-End/Final Evaluation (FE) examination.

A. Carry forward of marks in case of learner who fails in the Internal Assessments and/ or Semester-end examination in one or more subjects (whichever component the learner has failed although passing is on total marks).

B. A learner who PASSES in the Internal Examination but FAILS in the Semester-end Examination of the Course shall reappear for the Semester-EndExamination of that Course. However, his/her marks of internal examinations shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.

C. A learner who PASSES in the Semester-end Examination but FAILS in the Internal Assessment of the course shall reappear for the Internal Examination of that Course. However, his/her marks of Semester-End Examination shall be carried over and he/she shall be entitled for grade obtained by him/her on passing

ALLOWED TO KEEP TERMS (ATKT)

A. A learner shall be allowed to keep term for Semester II irrespective of number of heads/courses of failure in the Semester I.

B. A learner shall be allowed to keep term for Semester III wherever applicable if he/she passes each of Semester I and Semester II.

OR

C. A learner shall be allowed to keep term for Semester III wherever applicable irrespective of number of heads/courses of failure in the Semester I & SemesterII.

D. A learner shall be allowed to keep term for Semester IV wherever applicable if he/she passes each of Semester I, Semester II and Semester III.

OR

E. A learner shall be allowed to keep term for Semester IV wherever applicable irrespective of number of heads/courses of failure in the Semester I, SemesterII, and Semester III

F. A learner shall be allowed to keep term for Semester V wherever applicable if he/she passes each of Semester I, Semester II, Semester III and Semester IV.

OR

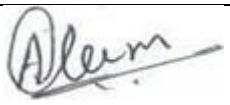
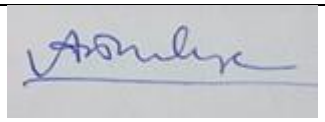
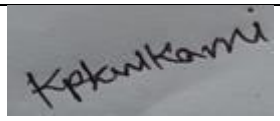
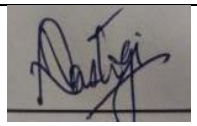
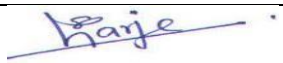
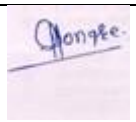
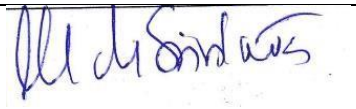
G. A learner shall be allowed to keep term for Semester V wherever applicable irrespective of number of heads/courses of failure in the Semester I, Semester II, Semester III, and Semester IV.

H. The result of Semester VI wherever applicable OR final semester shall be kept in abeyance until the learner passes each of Semester I, Semester II, Semester III, Semester IV, Semester V wherever applicable.

OR

I. A learner shall be allowed to keep term for Semester VI wherever applicable irrespective of number of heads/courses of failure in the Semester I, Semester II, Semester III, Semester IV and Semester V.

Team for creation of syllabus

Sr. No.	Name of the Members	College Name	Sign
1	Dr. Keyurkumar M. Nayak, Director, UM-GICED	Director, UM-GICED	
2	Dr. Aleem Ansari	Course Coordinator, UM-GICED	
3	Mr. Vivek Bangale	Tuff Coat Industry, Pune	
4	Mr. Anand Mulye	Omkar Industries, Vadodara	
5	Mr. Kiran P. Kulkarni	Garware Institute, UM-GICED	
6	Mr. Anil Rastogi	Garware Institute UM-GICED	
7	Dr. Shivram S. Garje	University of Mumbai	
8	Dr. Ravi Prakash Dongre	Technical Institute Pune	
9	Dr. Subhash C. Srivastava	HBTI, Kanpur	
10	Mr. Mandar Damle	Kansai Nerolac Paints Ltd, Mumbai	

Dr. Keyurkumar M. Nayak,
Director,
UM-GICED

Prof. (Dr.) Shivram S. Garje
Dean, Faculty of Science

Appendix B

Justification for (B.Sc. Paint Technology)

1.	Necessity for starting the course	The University of Mumbai's Garware Institute of Career Education & Development plans to introduce four years Full time B.Sc. Paint Technology. Paint technology course in Mumbai imparts adequate knowledge and develops the skill requirements to meet the demands of the industry and trains the students in theory and practical to fit in well and perform in an excellent manner. It also gives them exposure to manufacturing, quality control systems and modes of application. It grooms the students to take up executive and supervisory roles.
2.	Whether the UGC has recommended the course:	Yes, UGC has recommended the course as per gazette no. DL(N)-04/0007/2003-05 dated 11th July 2014. UGC encourages the incorporation of skill oriented and value-added courses to develop skilled manpower.
3.	Whether all the courses have commenced from the academic year 2023-2024	Yes, it would be commencing from the Academic year 2023-24 as per NEP 2020. However, the course has been launched in the year 2017-18.
4.	The courses started by the University are self-financed, whether adequate number of eligible permanent faculties are available?	Yes, this course is self-financed. The expert visiting faculty from industries come to teach this course.
5.	To give details regarding the duration of the Course and is it possible to compress the course?	The duration of the course is Four years (Eight Semester). It cannot be further compressed.
6.	The intake capacity of each course and no. of admissions given in the current academic year:	The intake capacity of this course is 60 students.The admission procedure is still ongoing.
7.	Opportunities of Employability/ Employment available after undertaking these courses:	The demand of Paint Technologists exists in manufacturing, application, quality control and techno-commercial aspects in various industries viz., paint, resins, pigments and allied industries, furniture, automobile, plastic, ship building, and printing inks as well.It is also possible to become an entrepreneur or a painting contractor.

Dr. Keyurkumar M. Nayak,
Director,
UM-GICED

Prof. (Dr.) Shivram S. Garje
Dean, Faculty of Science