# DEPARTMENT OF INDUSTRIAL CHEMISTRY
## COURSE CURRICULUM

| **PART-A: Introduction** | | | | |
|---|---|---|---|---|
| **Program:Bachelor in Science** *(Honors/ Honors with Research)* | | | **Semester - VIII** | Session: **2024-2025** |
| 1 | **Course Code** | **ICSE-09T** | | |
| 2 | **Course Title** | **TECHNOLOGY OF SELECTED FINISHED PRODUCT – DYES** | | |
| 3 | **Course Type** | **DSE** | | |
| 4 | **Pre-requisite(if,any)** | *As per program* | | |
| 5 | **Course Learning. Outcomes(CLO)** | ➢ *To understand the technology of finished product.*<br>➢ *To understand the chemical constituent of finished product.*<br>➢ *To understand the process of making of finished product.*<br>➢ *To understand the applications of finished products.* | | |
| 6 | **Credit Value** | **3 Credits** | *Credit = 15 Hours -learning & Observation* | |
| 7 | **Total Marks** | **Max.Marks:** | **100** | **Min Passing Marks:40** |

**PART -B: Content of the Course**

**Total No.of Teaching–learning Periods(01 Hr. per period) - 45 Periods (45 Hours)**

| Unit | Topics(Course contents) | No.of Period |
|---|---|---|
| I | Theory of color & Chemical constitution of dyes based on textile fibers and application<br>Classification of dyes based on method of application and chemical structure.<br>Intermediate compounds:- Introduction, Classification, Synthesis of H-Acid, G-Acid, R Acid, GamaAcid, 1,2,4-Acid, AAA, Bon-Acid, B-Napthol. | 12 |
| II | Study of following group of dyes:-<br>- Proceine / Reactive dyes.<br>- Napthol dyes.<br>- Indigo &Thio Indigo dyes.<br>- Pigment dyes.<br>- Optical brighteners.<br>- Anthraquinoid dyes.<br>- Azo dyes. | 11 |
| III | Study of following group of dyes:-<br>- Nitroso dyes.<br>- Nitro dyes.<br>- Azoic dyes.<br>- DPM dyes.<br>- TPM dyes.<br>- Phthaleins dyes.<br>- Xanthene dyes. | 11 |
| IV | Non-textile use of dyes:-<br>- Food dyes.<br>- Medicinal dyes.<br>- Leather dyes.<br>- Indicators.<br>- Paper dyes. | 11 |
| *Keywords* | *Colour & Dyes, Synthetic & Natural Dyes, Classification, Recent Applications* | |

*SignatureofConvener&Members (CBoS):*

## PART–C:Learning Resources

**Text Books, Reference Books and Others**

***Text Books Recommended –***

1. *Agrawal, O. P. (2001). Synthetic dyes.*
2. *Venkataraman, K. (Ed.). (1952). The chemistry of dyes and pigments. Blackie & Son Limited. (Note: Edited work, Venkataraman may not be the sole author)*
3. *Mudgal, S. P. (2015). Fundamentals of dye chemistry. New Age International (Publishers).*
4. *Desai, N. R. (2000). Textile dyes: Classification, chemistry and applications. Universal Publishing Company.*

***Reference Books Recommended –***

1. *Fierts-Dvid, H. E., & Balangey, L. (1975). Fundamental process of dye chemistry. Inter Science.*

**Online Resources–**

- https://www.sciencedirect.com/topics/medicine-and-dentistry/dye
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10685195/ https://en.m.wikipedia.org/?title=Synthetic_dyes&redirect=no -
- https://maiwa.com/collections/natural-dyes
- https://www.researchgate.net/publication/323960391_Classifications_properties_and_applications_of_textile_dyes_A_review
- https://www.slideshare.net/slideshow/dyes-and-pigments/79104161

## PART-D: Assessment and Evaluation

**Suggested Continuous Evaluation Methods:**
**Maximum Marks: 100 Marks**
**Continuous Internal Assessment(CIA):30 Marks**
**End Semester Exam(ESE):70 Marks**

| | | |
|---|---|---|
| **Continuous Internal Assessment(CIA): (By Course Teacher)** | Internal Test / Quiz-(2): **20 +20**<br>Assignment/Seminar- **10**<br>Total Marks -**30** | Better marks out of the two Test / Quiz**+** obtained marks in Assignment shall be considered against **30** Marks |
| **End Semester Exam (ESE):** | **Two section – A & B**<br>Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20Marks**<br>Section B: Descriptive answer type qts.,**1out of 2** from each unit- **4x10=40Marks** | |

***Name and Signature of Convener & Members of CBoS:***

# FOUR YEAR UNDERGRADUATE PROGRAM(2024 – 28)
## DEPARTMENT OF INDUSTRIAL CHEMISTRY
## COURSE CURRICULUM

| **PART-A: Introduction** | | | | |
|---|---|---|---|---|
| **Program:Bachelor in Science** *(Honors/ Honors with Research)* | | | **Semester - VIII** | Session: **2024-2025** |
| 1 | **CourseCode** | **CHSE-09P** | | |
| 2 | **CourseTitle** | **TECHNOLOGY OF SELECTED FINISHED PRODUCT – DYES LAB. COURSE** | | |
| 3 | **CourseType** | **DSE** | | |
| 4 | **Pre-requisite**(if,any) | ***As per program*** | | |
| 5 | **Course Learning. Outcomes(CLO)** | ➢ *To understand the synthesis and purification of dyes.*<br>➢ *Understanding characterization and applications of dyes.*<br>➢ *Employing different analytical methods to purify, characterize and evaluate applications of dyes.*<br>➢ *To apply spectroscopic methods to characterize and extract dyes.*<br>➢ *To conduct a visit of dye industry and preparation of report.* | | |
| 6 | **CreditValue** | **1 Credits** | *Credit =30 Hours Laboratory or Field learning/Training* | |
| 7 | **TotalMarks** | **Max.Marks:50** | | **Min Passing Marks:20** |

| **PART -B: Content of theCourse** | | |
|---|---|---|
| **TotalNo.of learning-Training/performancePeriods:30 Periods (30 Hours)** | | |
| **Module** | **Topics(Coursecontents)** | **No.ofPeriod** |
| **Lab./Field Training/ Experiment Contents of Course** | • Synthesis of dyes.<br>• Chromatographic methods for dye purification.<br>• Analytical methods for dye and pigment characterization.<br>• Extraction of dyes by nanomaterials or by other means.<br>• Spectroscopic methods to characterize dyes.<br>• Visit dye industry and prepare report.<br>• Execution of field visit/seminar/report/quiz/project etc. | **30** |
| *Keywords* | *Dye, synthesis, purification, analytical methods, spectroscopic methods, characterization of dyes, industry, nanomaterials.* | |

*SignatureofConvener&Members (CBoS):*

## PART–C:Learning Resources

**Text Books, Reference Books and Others**

***Text Books Recommended –***

1. *Ajayi, S. B. (2009). Dyes and dyeing in ancient India. National Book Trust, India.*
2. *Chatwal, A., & Anand, S. (2011). Instrumental methods of chemical analysis (5th ed.). Anand Publishers.*
3. *Mehta, B. K., & Singh, M. (2005). Analysis of dyes and pigments. CBS Publishers & Distributors.*
4. *Pandey, S., & Sharma, H. C. (Eds.). (2014). Nanomaterials for textiles. Elsevier.*
5. *Agarwal, Y. K. (2001). A course in instrumental analysis. Krishna Publishers.*

***Reference Books Recommended –***

1. *Zollinger, H. (2003). Colour chemistry: Syntheses, properties, and applications of organic dyes and pigments. Wiley-VCH Verlag GmbH & Co. KGaA.*
2. *Snyder, L. R., & Kirkland, J. J. (2010).* High-performance liquid chromatography *(3rd ed.). John Wiley & Sons, Inc.*
3. *Sherma, J., & Fried, B. (2002).* Modern chromatographic techniques in food analysis. *CRC Press.*

**Online Resources–**

- **e-Resources / e-books and e-learning portals**
- **https://archive.nptel.ac.in/courses/116/104/116104046/**
- **https://nptel.ac.in/courses/116104044**
- **https://onlinecourses.nptel.ac.in/noc22_te04/preview**
- **https://onlinecourses.swayam2.ac.in/cec19_te01/preview**

**Online Resources–**

- **e-Resources / e-books and e-learning portals**

## PART-D: Assessment and Evaluation

**Suggested Continuous Evaluation Methods:**
**Maximum Marks: 50 Marks**
**Continuous Internal Assessment(CIA):15 Marks**
**End Semester Exam(ESE):35Marks**

| | | |
|---|---|---|
| **Continuous Internal Assessment(CIA):** **(By Course Teacher)** | Internal Test / Quiz-(2): **10 &10**<br>Assignment/Seminar +Attendance- **05**<br>Total Marks **-15** | Better marks out of the two Test / Quiz +obtained marks in Assignment shall be considered against **15** Marks |
| **End Semester Exam (ESE):** | **Laboratory / Field Skill Performance: On spot Assessment**<br>**Y. Performed the Task based on lab. work - 20 Marks**<br>**Z. Spotting based on tools& technology (written) – 10 Marks**<br>**AA. Viva-voce (based on principle/technology) - 05 Marks** | **Managed by Course teacher as per lab. status** |

***Name and Signature of Convener & Members of CBoS:***