

ADD ON COURSE 2022-23		
EXPLORATION OF COLOUR CHEMISTRY IN MODERN APPLICATION		
Duration: 35 Hours	Department of Chemistry	Course code: CH-ECC
<p><b>Course Description:</b>            This course delves into the fascinating world of colour chemistry and its applications in various modern industries. Students will explore the principles of colour perception, colorants, pigments, dyes, and their synthesis. Topics include the chemistry behind colour formation, colour theory, colour measurement techniques, and the application of colour chemistry in textiles, paints, cosmetics, and other industries. Through lectures, laboratory experiments, and projects, students will gain a comprehensive understanding of colour chemistry and its significance in modern technology and design.</p>		
<p><b>Course Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Understand the principles of colour chemistry and colour perception.</li> <li>2. Learn about the synthesis and properties of colorants, pigments, and dyes.</li> <li>3. Explore the application of colour chemistry in various industries, including textiles, paints, cosmetics, and plastics.</li> <li>4. Gain proficiency in colour measurement techniques and colour quality control.</li> <li>5. Investigate the environmental and sustainability aspects of colour chemistry.</li> <li>6. Develop skills in laboratory synthesis and characterization of colorants.</li> <li>7. Apply knowledge of colour chemistry to solve real-world problems and design challenges.</li> </ol>		
<b>Module 1:</b>		<b>07 Hours</b>
<p><b>Introduction to Colour Chemistry</b></p> <ul style="list-style-type: none"> <li>• Definition and significance of colour chemistry</li> <li>• Historical overview of colorants and pigments</li> <li>• Colour perception and the physiology of vision</li> </ul> <p><b>Colorants and Pigments</b></p> <ul style="list-style-type: none"> <li>• Types of colorants (organic, inorganic, natural, synthetic)</li> <li>• Pigments vs. dyes: properties and applications</li> <li>• Synthesis and characterization of pigments</li> </ul> <p><b>Dye Chemistry</b></p> <ul style="list-style-type: none"> <li>• Classification of dyes (acid, basic, direct, reactive, disperse, vat, etc.)</li> <li>• Dye synthesis methods (azo dyes, anthraquinone dyes, etc.)</li> <li>• Dyeing techniques and applications in textiles</li> </ul>		
<b>Module 2:</b>		<b>07 Hours</b>
<p><b>Colour Theory and Colour Measurement</b></p> <ul style="list-style-type: none"> <li>• Colour models (RGB, CMYK, HSL, CIE Lab*)</li> <li>• Colour measurement techniques (spectrophotometry, colorimeters)</li> <li>• Colour matching and quality control in industry</li> </ul> <p><b>Application of Colour Chemistry in Textiles</b></p> <ul style="list-style-type: none"> <li>• Dyeing and printing processes in textile industry</li> <li>• Specialty finishes and effects (fluorescent, iridescent, thermochromics, etc.)</li> </ul>		



<ul style="list-style-type: none"> <li>• Sustainability considerations in textile dyeing</li> </ul> <p><b>Colorants in Paints and Coatings</b></p> <ul style="list-style-type: none"> <li>• Pigments and additives in paint formulations</li> <li>• Role of colorants in achieving desired colour and properties</li> <li>• Environmental impact and regulations in paint manufacturing</li> </ul>	
<b>Module 3:</b>	<b>08 Hours</b>
<p><b>Colorants in Plastics and Polymers</b></p> <ul style="list-style-type: none"> <li>• Colour master batch and compounding techniques</li> <li>• Incorporating colorants into polymer matrices</li> <li>• Colour stability and lightfastness in plastic applications</li> </ul> <p><b>Colorants in Cosmetics and Personal Care Products</b></p> <ul style="list-style-type: none"> <li>• Pigments and dyes in cosmetic formulations</li> <li>• Regulatory aspects and safety considerations</li> <li>• Trends in colour cosmetics and consumer preferences</li> </ul> <p><b>Specialty Applications of Colour Chemistry</b></p> <ul style="list-style-type: none"> <li>• Colorants in food and beverage industry</li> <li>• Colorants in pharmaceuticals and healthcare products</li> <li>• Colorants in digital printing and electronic displays</li> </ul>	
<b>Module 4:</b>	<b>08 Hours</b>
<p><b>Environmental and Sustainability Aspects</b></p> <ul style="list-style-type: none"> <li>• Environmental impact of colorants and dyeing processes</li> <li>• Green chemistry approaches in colour chemistry</li> <li>• Sustainable alternatives and biodegradable colorants</li> </ul> <p><b>Laboratory Synthesis and Characterization</b></p> <ul style="list-style-type: none"> <li>• Synthesis of organic dyes and pigments</li> <li>• Characterization techniques (UV-Vis spectroscopy, HPLC, etc.)</li> <li>• Colour matching experiments</li> </ul> <p><b>Project Presentation and Discussion</b></p> <ul style="list-style-type: none"> <li>• Group projects on a selected topic in colour chemistry</li> <li>• Presentation of project findings and discussion</li> <li>• Reflection on the role of colour chemistry in modern applications</li> </ul>	
<p><b>Textbook:</b>  "Colour Chemistry: Synthesis, Properties, and Applications of Organic Dyes and Pigments" by Heinrich Zollinger</p> <p><b>References:</b></p> <ol style="list-style-type: none"> <li>1. "Industrial Dyes: Chemistry, Properties, Applications" by Klaus Hunger and Peter Mischke</li> <li>2. "Handbook of Textile and Industrial Dyeing: Volume 2, Applications of Dyes" edited by M. Clark</li> </ol> <p>1.</p>	

