**L**esson Plan (2025-26)

Name of the Assistant/ Associate Professor:-Dr. Yogita Yadav

Class and Section: B.Sc 4th Sem.

Subject: chemistry

Paper: inorganic and organic

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| Week1 | Dates | Topics to be covered |
|  |  | chemistry of f – block elements LanthanidesElectronic structure |
|  | oxidation states and ionic radii and lanthanide contraction, |
|  | complex formation |
|  | occurrence and isolation, |
|  | lanthanide compounds. |
|  | Assignment and announcement of test |
| Week 2 |  | chemis try of f – block elements ActinidesGeneral features and chemistry of actinides  |
|  | chemistry of separation of Np, Pu and Am from U |
|  | Comparison of properties of Lanthanides and Actinides |
|  | Comparison of properties of and with trans ition elements . |
|  | Assignment and announcement of test |
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| Week3 |  | **Theory of Quali tative and Quanti tative Inorganic Analysis-I**Chemistry of analysis of various acidic radicals |
|  |  Chemistry of identification of acid radicals in typical combinations |
|  | Chemistry of interference of acid radicals including their removal in the analys is of basic radicals. |
|  | Assignment and announcement of test |
|  | Test of earlier unit |
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| Week 4 |  | **Theory of Quali tative and Quanti tative Inorganic Analysis-II**Chemistry of analysis of various groups of basic radicals, ,  |
|  | Theory of precipitation, |
|  | co- precipitation |
|  | Post- precipitation, |
|  | purification of precipitates |
|  | Assignment and announcement of test |
| Week 5 |  | **Infrared (IR) absorption spectroscopy**Molecular vibrations |
|  | Hooke's law, selection rules |
|  | intensity and position of IR bands |
|  | measurement of IR spectrum |
|  | fingerprint region |
|  | characteristic absorptions of various functional groups  |
| Week 6 |  | Applica tions of IR spectroscopy in structure e lucidation of simple organic compounds. |
|  | interpretation of IR spectra of simple organic compounds. |
|  | **Amines**Structure and nomenclatu re of amines,.,  |
|  | phys ical properties |
|  | Separation of a mixture of primary, secondary and tertiary amines. |
|  | Structural featu res affecting basicity of amines. |
| Week 7 |  | Prepa ration of alkyl and aryl amines (reduction of nitro compounds, nitriles, |
|  |  reductive amination of aldehydic and ketonic compounds |
|  | . Gabrielphthalimide reaction |
|  | Hofmann bromamide reaction |
|  | electrophilic aromatic substitution in aryl amines |
|  | reactions of amines with nitrous acid. |
| Week 8 |  | 1. **Diazonium Salts**

Mechanism of diazotisation |
|  | Replacement of diazo group by H, OH, F, Cl, Br, I, NO2 and CN groups, |
|  | reduction of diazonium salts to hyrazines |
|  | coupling reaction and its synthetic application. |
|  | structure of benzene diazonium chloride |
|  | Assignment and announcement of test |
| Week 9 |  | Nitro CompoundsPreparation of nitro alkanes and nitro arenes  |
|  | their chemical reactions. |
|  | Mechanism of electrophilic substitution reactions in nitro arenes |
|  | reductions in acidic, neutral and alkaline medium. |
|  | Test of earlier unit |
|  | Assignment and announcement of test |
| Week 10 |  | **Aldehydes and Ketones**Nomenclature and structure of the carbonyl group.,.  |
|  | Synthesis of aldehydes and  |
|  | advantage of oxidation of alcohols with chromium trioxide (Sarett reagent)  |
|  | Physical properties |
|  | Comparison of reactivities of aldehydes and ketones. |
|  | Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, |
| Week 11 |  | Condensation with ammonia and its derivatives |
|  | Wittig reaction. |
|  | Mannich reaction. |
|  | Oxidation of aldehydes, |
|  | Baeyer–Villiger oxidation of ketones |
|  | Cannizzaro reaction |
| Week 12 |  | .,. MPV, |
|  | Clemmensen |
|  | aldol, condensations |
|  | Perkin condensations |
|  | Wolff-Kishner reduction |
|  | LiAlH4 and NaBH4 reductions |
| Week13 |  | Knoevenagel reductions |
|  | pyridinium chlorochromate (PCC) and pyridinium dichromate., |
|  | ketones with particular reference to the synthesis of aldehydes from acid chlorides |
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| Week 14 |  | revision |
|  | test |
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|  | Assignments collection |
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| Week 15 |  | revision |
|  | test |
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|  | Assignments collection |
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