<table>
<tr><td>Course Code</td><td colspan="3">CHE402M3</td></tr>
<tr><td>Course Title</td><td colspan="3">Advanced Nuclear Chemistry, Bioinorganic and Supramolecular Chemistry</td></tr>
<tr><td>Credit Value</td><td colspan="3">03</td></tr>
<tr><td rowspan="2">Hourly Breakdown</td><td>Theory</td><td>Practical</td><td>Independent Learning</td></tr>
<tr><td>45</td><td>-</td><td>105</td></tr>
<tr><td>Objective/s</td><td colspan="3">• Provide the concepts of Bioinorganic chemistry
• Discuss the functions of Inorganic compounds in biological system
• Illustrate the principles of Nuclear chemistry
• Describe the perceptions and applications of Radiochemistry
• Introduce the fundamental concepts of Supramolecular Chemistry</td></tr>
<tr><td>Intended Learning Outcomes</td><td colspan="3">• Develop mechanisms for the role of metal ions in Biological system
• Formulate an efficient model for oxygen transport
• Evaluate the radioactivity of radioactive compounds
• Design methods for the separation of radioisotopes
• Describe the importance and action of intermolecular interactions in the assembly of different supramolecular systems
• Analyze supramolecular structure</td></tr>
<tr><td>Course Contents</td><td colspan="3">Bioinorganic chemistry
• Bioelements and their classifications, basic reactions in biological systems and the role of metal ions: role of Na^+/K^+ and transport across the membrane, biological oxygen transport, management and synthetic oxygen carriers, role of iron in life process, cytochromes, iron-sulphur proteins.
• Nitrogen fixation, biological role of copper and magnesium, chlorophylls and natural and artificial photosynthesis, metals in medicine</td></tr>
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<tr><td></td><td colspan="2">Advanced Nuclear and Radio-chemistry

• Review of radio chemistry, decay and recovery of radioactive elements, kinetics, units, detection and methods of measurements of radioactivity, nuclear shell model, mass defect and nuclear binding energy, artificial transmutation and nuclear reaction
• Classification of nuclides, separation of isotopes: diffusion methods, fractional evaporation method, electrolytic method, mass spectroscopic method and chemical exchange method.
• Application of radioisotopes in medicine, industries, agriculture, radiocarbon dating, detection of reaction pathways and age of materials

Supramolecular Chemistry

• Molecular recognition, host-guest chemistry, self-assembly, supramolecular chemistry of life
• Molecular hosts: crown ether, calixarene, curcubiturils, cyclophane, cation and anion binding, metal organic containers, clathrate hydrates, porous materials, metal organic frameworks, covalent organic frameworks</td></tr>
<tr><td>Teaching and Learning Methods / Activities</td><td colspan="2">Lectures, tutorial discussion, small group assignment and home-work assignments, e-learning, online learning</td></tr>
<tr><td rowspan="2">Evaluation/Assessment Strategy</td><td>In-course Assessments</td><td>End of Course Examination</td></tr>
<tr><td>30%</td><td>70%</td></tr>
<tr><td>Recommended References</td><td colspan="2">• Overton, T. L., Rourke, J. P., Weller, M. T., and Armstrong, F. A., “Inorganic Chemistry”, 7th Edition, Oxford University Press, 2018.
• Miessler, G., Fischer, P. J., Tarr, D. A., “Inorganic Chemistry”, 5th Edition Pearson Education, 2014.
• Atkins, P., Rourke, T. O. J., Weller, M. and Armstrong, F., “Inorganic Chemistry”, 5th Edition, Oxford University Press, 2010.</td></tr>
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	• Arnikar, H. J., “Essentials of Nuclear Chemistry”, New Age Publishers, 2009. • Steed, J. W., and Atwood, J. L., “Supramolecular Chemistry”, 2nd Edition, John Wiley, 2009.