

**Republic of Iraq  
The Ministry of Higher Education  
& Scientific Research**



**University:Kerbala  
College:Science  
Department:Chemistry  
Stage:First**

# **Lectures in Inorganic I Chemistry**

By

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|  |   |   |  |  |   |   |   |   |  |  |  |   |  |  |  |   |  |   |  |
|--|---|---|--|--|---|---|---|---|--|--|--|---|--|--|--|---|--|---|--|
| 1<br><div>H</div> <div>HYDROGEN</div> <div>1</div>     | <div><div><div>6</div><div>C</div><div>CARBON</div><div>12</div></div><div><div>Atomic Number = Number of Protons = Number of Electrons</div><div>Chemical Symbol</div><div>Chemical Name</div><div>Atomic Weight = Number of Protons + Number of Neutrons*</div></div></div> |   |  |  |   |   |   |   |  |  |  |   |  |  |  |   | 2<br><div>He</div> <div>HELIUM</div> <div>4</div>        |   |  |
| 3<br><div>Li</div> <div>LITHIUM</div> <div>7</div>     | 4<br><div>Be</div> <div>BERYLLIUM</div> <div>9</div>  | NON-METALS  |  |  |   |   |   |   |  |  |  |   |  | 5<br><div>B</div> <div>BORON</div> <div>11</div>         | 6<br><div>C</div> <div>CARBON</div> <div>12</div>          | 7<br><div>N</div> <div>NITROGEN</div> <div>14</div>       | 8<br><div>O</div> <div>OXYGEN</div> <div>16</div>        | 9<br><div>F</div> <div>FLUORINE</div> <div>19</div>   | 10<br><div>Ne</div> <div>NEON</div> <div>20</div>  |
| 11<br><div>Na</div> <div>SODIUM</div> <div>23</div>    | 12<br><div>Mg</div> <div>MAGNESIUM</div> <div>24</div>  | METALS  |  |  |   |   |   |   |  |  |  |   |  | 13<br><div>Al</div> <div>ALUMINUM</div> <div>27</div>    | 14<br><div>Si</div> <div>SILICON</div> <div>28</div>       | 15<br><div>P</div> <div>PHOSPHORUS</div> <div>31</div>    | 16<br><div>S</div> <div>SULFUR</div> <div>32</div>       | 17<br><div>Cl</div> <div>CHLORINE</div> <div>35</div> | 18<br><div>Ar</div> <div>ARGON</div> <div>40</div> |
| 19<br><div>K</div> <div>POTASSIUM</div> <div>39</div>  | 20<br><div>Ca</div> <div>CALCIUM</div> <div>40</div>  | 21<br><div>Sc</div> <div>SCANDIUM</div> <div>45</div> | 22<br><div>Ti</div> <div>TITANIUM</div> <div>48</div>        | 23<br><div>V</div> <div>VANADIUM</div> <div>51</div>   | 24<br><div>Cr</div> <div>CHROMIUM</div> <div>52</div>     | 25<br><div>Mn</div> <div>MANGANESE</div> <div>55</div>  | 26<br><div>Fe</div> <div>IRON</div> <div>56</div>       | 27<br><div>Co</div> <div>COBALT</div> <div>59</div>       | 28<br><div>Ni</div> <div>NICKEL</div> <div>59</div>        | 29<br><div>Cu</div> <div>COPPER</div> <div>64</div>        | 30<br><div>Zn</div> <div>ZINC</div> <div>65</div>          | 31<br><div>Ga</div> <div>GALLIUM</div> <div>70</div>    | 32<br><div>Ge</div> <div>GERMANIUM</div> <div>73</div>   | 33<br><div>As</div> <div>ARSENIC</div> <div>75</div>     | 34<br><div>Se</div> <div>SELENIUM</div> <div>79</div>      | 35<br><div>Br</div> <div>BROMINE</div> <div>80</div>      | 36<br><div>Kr</div> <div>KRYPTON</div> <div>84</div>     |   |  |
| 37<br><div>Rb</div> <div>RUBIDIUM</div> <div>85</div>  | 38<br><div>Sr</div> <div>STRONTIUM</div> <div>88</div>  | 39<br><div>Y</div> <div>YTTRIUM</div> <div>89</div>   | 40<br><div>Zr</div> <div>ZIRCONIUM</div> <div>91</div>       | 41<br><div>Nb</div> <div>NIOBIUM</div> <div>93</div>   | 42<br><div>Mo</div> <div>MOLYBDENUM</div> <div>96</div>   | 43<br><div>Tc</div> <div>TECHNETIUM</div> <div>98</div> | 44<br><div>Ru</div> <div>RUTHENIUM</div> <div>101</div> | 45<br><div>Rh</div> <div>RHODIUM</div> <div>103</div>     | 46<br><div>Pd</div> <div>PALLADIUM</div> <div>106</div>    | 47<br><div>Ag</div> <div>SILVER</div> <div>108</div>       | 48<br><div>Cd</div> <div>CADMIUM</div> <div>112</div>      | 49<br><div>In</div> <div>INDIUM</div> <div>115</div>    | 50<br><div>Sn</div> <div>TIN</div> <div>119</div>        | 51<br><div>Sb</div> <div>ANTIMONY</div> <div>122</div>   | 52<br><div>Te</div> <div>TELLURIUM</div> <div>128</div>    | 53<br><div>I</div> <div>IODINE</div> <div>127</div>       | 54<br><div>Xe</div> <div>XENON</div> <div>131</div>      |   |  |
| 55<br><div>Cs</div> <div>CESIUM</div> <div>133</div>   | 56<br><div>Ba</div> <div>BARIUM</div> <div>137</div>  |   | 72<br><div>Hf</div> <div>HAFNIUM</div> <div>178</div>        | 73<br><div>Ta</div> <div>TANTALUM</div> <div>181</div> | 74<br><div>W</div> <div>TUNGSTEN</div> <div>184</div>     | 75<br><div>Re</div> <div>RHENIUM</div> <div>186</div>   | 76<br><div>Os</div> <div>OSMIUM</div> <div>190</div>    | 77<br><div>Ir</div> <div>IRIDIUM</div> <div>192</div>     | 78<br><div>Pt</div> <div>PLATINUM</div> <div>195</div>     | 79<br><div>Au</div> <div>GOLD</div> <div>197</div>         | 80<br><div>Hg</div> <div>MERCURY</div> <div>201</div>      | 81<br><div>Tl</div> <div>THALLIUM</div> <div>204</div>  | 82<br><div>Pb</div> <div>LEAD</div> <div>207</div>       | 83<br><div>Bi</div> <div>BISMUTH</div> <div>209</div>    | 84<br><div>Po</div> <div>POLONIUM</div> <div>209</div>     | 85<br><div>At</div> <div>ASTATINE</div> <div>210</div>    | 86<br><div>Rn</div> <div>RADON</div> <div>222</div>      |   |  |
| 87<br><div>Fr</div> <div>FRANCIUM</div> <div>223</div> | 88<br><div>Ra</div> <div>RADIUM</div> <div>226</div>  |   | 104<br><div>Rf</div> <div>RUTHERFORDIUM</div> <div>263</div> | 105<br><div>Db</div> <div>DUBNIUM</div> <div>268</div> | 106<br><div>Sg</div> <div>SEABORGIUM</div> <div>271</div> | 107<br><div>Bh</div> <div>BOHRIUM</div> <div>270</div>  | 108<br><div>Hs</div> <div>HASSIUM</div> <div>270</div>  | 109<br><div>Mt</div> <div>MEITNERIUM</div> <div>278</div> | 110<br><div>Ds</div> <div>DARMSTADIUM</div> <div>281</div> | 111<br><div>Rg</div> <div>ROENTGENIUM</div> <div>281</div> | 112<br><div>Cn</div> <div>COPERNICIUM</div> <div>285</div> | 113<br><div>Nh</div> <div>NIHONIUM</div> <div>286</div> | 114<br><div>Fl</div> <div>FLEROVIUM</div> <div>289</div> | 115<br><div>Mc</div> <div>MOSCOVIUM</div> <div>289</div> | 116<br><div>Lv</div> <div>LIVERMORIUM</div> <div>293</div> | 117<br><div>Ts</div> <div>TENNESSINE</div> <div>294</div> | 118<br><div>Og</div> <div>OGANESSON</div> <div>294</div> |   |  |

| KEY |                              |
|-----|------------------------------|
|     | = Solid at room temperature  |
|     | = Liquid at room temperature |
|     | = Gas at room temperature    |
|     | = Radioactive                |
|     | = Artificially Made          |

|                                     |                                   |  |                                     |                                      |                                     |                                     |                                      |                                     |                                       |                                       |                                    |  |                                     |                                       |
|-------------------------------------|-----------------------------------|--|-------------------------------------|--------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|-------------------------------------|---------------------------------------|---------------------------------------|------------------------------------|--|-------------------------------------|---------------------------------------|
| 57<br><b>La</b><br>LANTHANUM<br>139 | 58<br><b>Ce</b><br>CERIUM<br>140  | 59<br><b>Pr</b><br>PRASEODYMIUM<br>141 | 60<br><b>Nd</b><br>NEODYMIUM<br>144 | 61<br><b>Pm</b><br>PROMETHIUM<br>145 | 62<br><b>Sm</b><br>SAMARIUM<br>150  | 63<br><b>Eu</b><br>EUROPIUM<br>152  | 64<br><b>Gd</b><br>GADOLINIUM<br>157 | 65<br><b>Tb</b><br>TERBIUM<br>159   | 66<br><b>Dy</b><br>DYSPROSIUM<br>163  | 67<br><b>Ho</b><br>HOLMIUM<br>165     | 68<br><b>Er</b><br>ERBIUM<br>167   | 69<br><b>Tm</b><br>THULIUM<br>169      | 70<br><b>Yb</b><br>YTTERBIUM<br>173 | 71<br><b>Lu</b><br>LUTETIUM<br>175    |
| 89<br><b>Ac</b><br>ACTINIUM<br>227  | 90<br><b>Th</b><br>THORIUM<br>232 | 91<br><b>Pa</b><br>PROTACTINIUM<br>231 | 92<br><b>U</b><br>URANIUM<br>238    | 93<br><b>Np</b><br>NEPTUNIUM<br>237  | 94<br><b>Pu</b><br>PLUTONIUM<br>244 | 95<br><b>Am</b><br>AMERICIUM<br>243 | 96<br><b>Cm</b><br>CURIUM<br>247     | 97<br><b>Bk</b><br>BERKELIUM<br>247 | 98<br><b>Cf</b><br>CALIFORNIUM<br>251 | 99<br><b>Es</b><br>EINSTEINIUM<br>252 | 100<br><b>Fm</b><br>FERMIUM<br>257 | 101<br><b>Md</b><br>MENDELEVIUM<br>258 | 102<br><b>No</b><br>NOBELIUM<br>259 | 103<br><b>Lr</b><br>LAWRENCIUM<br>262 |

\* The atomic weights listed on this Table of Elements have been rounded to the nearest whole number. As a result, this chart actually displays the **mass number** of a specific isotope for each element. An element's complete, unrounded atomic weight can be found on the It's Elemental website: <http://education.jlab.org/itselemental/>

## **Syllabus for Inorganic chemistry of First stage**

- **Introduction about inorganic chemistry**
- **Atomic structure**
- **The origins of radiation**
  - a- From extranuclear processes**
  - b- From intranuclear processes —radioactivity**
- **Electromagnetic radiation and interference it with material**
- **Bohr theory for hydrogen atom**
- **Atomic spectra**
- **Fall through Bohr theory**
- **Quantum numbers**
- **Atomic orbital's**
- **Periodic table**
- **Term symbols**
- **Periodic properties of atoms**
- **Ionic compounds**
- **Covalent compounds and bonding theories**
- **Hydrogen**
- **The group 1 elements: the alkali metals**
- **The group 2 elements: the alkaline earth metals**
- **The group 13 elements**
- **The group 14 elements**

## **Textbooks and references books**

1. *Inorganic Chemistry, 5th Edition; Gary. L. Miessler and Donald . A. Tarr (2014).*
2. *Inorganic Chemistry” by Catherine. E. Housecroft and Alan G. Sharpe, Prentice Hall (4th Edition (2012).*
3. *Basic Inorganic Chemistry, 3<sup>rd</sup> ed., by F. A. Cotton et al., Wiley (2007).*
4. *Inorganic Chemistry principles of structure and reactivity 4th ed, by James E. Huhhey et al, Harper Collins college Puplishers (1993)*
5. *Shriver & Atkins' Inorganic Chemistry, by Atkins, Overton, Rourke, Weller, Armstrong, 5th Edition. Oxford (2010).*
6. *Inorganic Chemistry, by D. F. Shriver, P.W. Atkins and C. H. Langford, Oxford (1990).*