

COURSE WISE BREAKUP

Fourth Year Eighth Semester

SPECIALIZATION

INORGANIC CHEMISTRY

THEORY

COURSE CODE	TITLE	CREDIT HOURS	MARKS
CHEM-454	PAPER-IV: INORGANIC CHEMISTRY	03	100
CHEM-455	PAPER-V: INORGANIC CHEMISTRY	03	100
CHEM-456	PAPER-VI: INORGANIC CHEMISTRY	03	100

PRACTICALS

COURSE CODE	TITLE	CREDIT HOURS	MARKS
CHEM-452	INORGANIC CHEMISTRY (RESEARCH PROJECT)	06	200

- Total Credits of the Semester = 15 (theory 09 & practicles 06 credits)
- Maximum Marks = 500 (theory 300 & practicles 200 marks)

4th Year; 8th Semester

PAPER-IV

Title of the Course: **INORGANIC CHEMISTRY**

Code: **CHEM-454**

Credit Hours: **03**

Marks: **100**

Objective of the Program

After completing this program students will be able to learn and have knowledge of the following:

1. Chemistry of Organometallics with especially with reference to their types and bonding.
2. Reactivity of Organometallic Compounds in Homogenous Catalytic

Course Contents:

Chemistry of Organometallics

History and introduction to organometallic compounds, types of bonding. Transition metals; single, double and triple bonds to carbon (compound types, acyls, alkylidene complexes and alkylidyne complexes), delocalized hydrocarbon systems (alkenes, olefins, allyl and butadienes), alkyne complexes, cyclic π -complexes (five- and six- member rings).

Organometallic Compounds in Homogenous Catalytic Reactions

Homogenous catalytic hydrogenation, dimerization, oligomerization, polymerization, oxidation, hydrosilation, hydroformylation of olefins. Catalytic polymerization of acetylenes, insertion reactions, use of organometallic compounds in organic synthesis.

RECOMMENDED BOOKS:

1. Powell, P., "Principles of Organometallics Chemistry", 2nd edition London, 1995.
2. Akio Yamamoto "Organotransition Metal Chemistry", Printice Hall, 1992.
3. F. A. Cotton, G. Wilkinson, C. A. Murillo and M. Bochmann, "Advanced Inorganic Chemistry", 6th Ed., Wiley-Interscience, New York, 1999.
4. Miessler G.L. and Tar Donald, A. "Inorganic Chemistry" Prentice Hall Int. edition, 1991.
5. Douglas, McDaniel & John Alexander. "Concepts and Models of Inorganic Chemistry" by John Willey and Sons, 1994.
6. Zuckerman, H., "Basic Organometallic Chemistry", 2nd Ed, 1985.
7. William. J., Modern inorganic chemistry second edition McGraw Hill Company, 1991.
8. Porter Field. W.W., Inorganic Chemistry a Unified Approach 2nd ed. Elsevier Publishers, 2005.

4th Year; 8th Semester

PAPER-V

Title of the Course: **INORGANIC CHEMISTRY**

Code: **CHEM-455**

Credit Hours: **03**

Marks: **100**

Objective of the Program

After completing this program students will be able to learn the following:

1. Magneto Chemistry
2. Oxidative Addition and Reductive Elimination

Course Contents:

Magnetochemistry

Theory of magnetism, diamagnetism, paramagnetism, ferro-, ferri- and antiferromagnetism, magnetic susceptibility, magnetic moments, Faraday's & Gouy's methods, orbital contribution to magnetic moment, Russell-Sanders coupling scheme, derivation of term symbols of for $p1 - p6$ and $d1 - d10$ systems, pigeon holes diagram, effect of temperature on magnetic properties of complexes. Magnetic moment of lengthanise.

Oxidative Addition and Reductive Elimination

Oxidative Addition: one electron oxidative addition, addition of oxygen, addition of bimetallic species, hydrogen addition, HX addition, organic halides, Reductive Elimination Reactions.

RECOMMENDED BOOKS:

1. Douglas, B., McDaniel, D. and Alexander, J., "Concepts of Models of Inorganic Chemistry", John Wiley & Sons Inc., 3rd Edition, 1994
2. Huheey, J. E, Keiter, E. A. and Keiter, R. L., "Inorganic Chemistry: Principles of Structure and Reactivity", 4th Ed., Harper & Row, New York, 2001.
3. Mackay, K. M., Mackay, R. A. and Henderson, W., "Introduction to Modern Inorganic Chemistry", 5th Edition, Stanley Thomas Publisher Ltd. 1996
4. Miessler, G. L. and Tarr Donald, A., "Inorganic Chemistry", Prentice Hall International, 1991.
5. Purcell, K.F. and Kotz, J.C., "An Introduction to Inorganic Chemistry" W.B. Saunders Company Holt-Saunders Internal editions, 1980.

6. F. A. Cotton, G. Wilkinson, C. A. Murillo and M. Bochmann, "Advanced Inorganic Chemistry", 6th Ed., Wiley-Interscience, New York, 1999.
7. William. J., Modern inorganic chemistry second edition McGraw Hill Company 1991.

4th Year; 8th Semester

PAPER-VI

Title of the Course: **INORGANIC CHEMISTRY**

Code: **CHEM-456**

Credit Hours: **03**

Marks: **100**

Objective of the Program

After completing this program students will be able to learn the following:

1. The chemistry of radio isotopes, their reactions and applications.
2. Nuclear reactions

Course Contents:

Nuclear Chemistry

Introduction, theory of disintegrations, positive ray analysis, mass spectrograph, Aston mass spectrograph, Dempster mass spectrograph, Jordan double focusing mass spectrograph, Bainbridge mass spectrograph, structure of the nucleus, half life nuclear binding energy, artificial disintegration. Fission and Fusion reactions, Accelerators of charged particles, applications of Radio Isotopes

RECOMMENDED BOOKS:

1. Friedlander, Kennedy and Miller, "Nuclear and Radiochemistry", John Wiley and Sons, Inc. 2nd edition, 1964.
2. Choppin, G. R. and Rydberg, J., "Theory and Applications", Pergamon 1980.
3. Arnikar, H. J., "Essentials of Nuclear Chemistry", 4th edition, 1990.
4. Harvey, B.G. "Nuclear Physics and Chemistry", Prentice-Hall Inc., 1990.
5. Naqvi, I. I., "Radiochemistry", University Grants Commission, 1990.

4th Year; 8th Semester

Title of the Practicals: **INORGANIC CHEMISTRY (RESERAHC PROJECT)**

Code: **CHEM-452**

Credit Hours: **06**

Marks: **200**

RECOMMENDED BOOKS:

1. Bassette, J., Denney, G. H. and Mendham, J., "Vogel's Textbook of Quantitative Inorganic Analysis Including Elementary Instrumental Analysis" English Language Book Society, 4th Edition, 1981.
2. Vogel, A. I., "A Textbook of Micro and Semi-micro Qualitative Inorganic Analysis" Longman Green & Co. 1995.
3. Fritz, J. S. and Schenk, G. H., "Quantitative Analytical Chemistry", Allyn and Bacon Inc., 4th Edition, 1979.
4. Pass, G and Sutcliffe, H., "Practical Inorganic Chemistry", Van Nostrand Reinhold Company, 1972.