equivalent dose, effective dose, committed equivalent dose, collective equivalent dose, biological effectiveness, tissue equivalence.

UNIT II (13 hrs)

Radioisotopes: Good Laboratory Practices in a radioisotope laboratory; Safe-handling of radioisotopes with special emphasis on isotopes used in biotechnology ^{32}P, ^{35}S, ^{14}C, ^{3}H, ^{125}I. classification of radioisotope laboratories, units of radiation dose, measuring devices. Applications of radiation in medicine, industry, agriculture. Diagnostic techniques using radioisotopes and radiotracers, Cancer therapy, autoradiography techniques, gamma knife radiosurgery, radioimmunoassay (RIA) and immunoradiometric assay (IRMA).

UNIT III (14hrs)

Mechanism of direct and indirect action of radiation at cellular level. Nature of radiation damage at molecular, subcellular and cellular level. DNA damage and chromosomal aberrations. Mitotic catastrophe. Radiation damage: Lethal and sublethal damage, Cell survival curves, Effect of different radiation species and radiation dose/dose rate. Radiation effects on important organs of the human body: deterministic and stochastic effects; possible recovery pathways.

References

1. Radiation Biophysics – EL Alpen, Academic Press, 1997
2. Radiation Biology: Handbook for teachers and Students, IAEA, online
3. Basic and Clinical Radiobiology – Joiner M. and van der Kogel A. (ed) UK, online
4. Nuclear and Radiochemistry. Friedlander G., Kennedy JW., Macias ES., et al John Wiley and sons., 1981
5. Principles and Techniques of Biochemistry and Molecular Biology. Wilson K. and Walker J. (Eds.) 6th Ed., Cambridge Univ. Press., 2005

PRACTICALS (HARD CORE COURSES)

MOLECULAR BIOLOGY

Course outcomes:

After successful completion of the course, students will be able to:

CO 1. Acquire basic technical knowledge in molecular biology
CO 2. Understand development of models for cancer biology
CO 3. Learn techniques of histology of different tissues
CO 4. Learn tools and techniques used in developmental biology using suitable examples

Autoradiography to study the structure of molecules
Induction of tumors and its prevention
Structure of sperms and eggs
Spermatogenesis (e.g. grass hoppers)
Chick and *Drosophila* developmental stages
Histological identification of germ layers of developing embryos
Induced breeding in fishes