

SARDAR PATEL UNIVERSITY
Programme: MSc (Genetics)
Semester: IV
Syllabus with effect from: June 2010

Paper Code: PS04CGEN02	Total Credits: 4
Title Of Paper: Gene Therapy & Genetic Counseling	

Unit	Description in detail	Weightage (%)
1	Molecular Diagnostic Tools: Molecular basis of human genetic disorders and their detection, Polymerase chain reaction techniques, DNA, RNA and protein blotting, Tumor markers, Multi-locus DNA fingerprinting. Detection of single nucleotide polymorphism, Detection of antimicrobial resistance, Advantages and disadvantages of DNA-based diagnostic methods.	25 %
2	Molecular medicine, Gene targeting and Gene therapy: Introduction to molecular medicine and gene therapy, Diseases of genetic origin, Criteria for gene therapy, Types of gene therapy, Techniques for gene transfer, Vehicle for gene transfer: Viral and non-viral Latest Technology: Antisense, RNA interference, si RNA and ribozyme Techniques, Gene targeting, Risk associated with gene therapy Adenine deaminase (ADA), Duchenne muscular dystrophy (DMD), Cystic fibrosis, Familial hypercholesterolemia, Neoplastic and infectious diseases including cancer Ethical issues, Future of gene therapy	25 %
3	Stem cells and Gene therapy Biology and Genetics of stem cells Stem cell transplantation in various diseases Stem cells from Human donors and from placental cord blood Embryonic stem cells Stem cell transplantation in lysosomal storage and non storage disorders	25 %
4	Eugenics, euthenics and euphenics Genetic counseling and risk assessment Indications and purpose, Information gathering and construction of pedigrees, Patterns of inheritance: Mendelian and Non mendelian disorders, Biochemical and molecular genetic tests, Presymptomatic testing for late onset diseases (predictive medicine), Prenatal and pre-implantation diagnosis Indications for prenatal diagnosis, Noninvasive methods and invasive methods for sample collection, Legal and ethical considerations	25 %

Basic Text & Reference Books:

- Human molecular Genetics, Strachan T. & Read A.P., 3rd edition, published by Garland Science, 2004. 978-0815341840
- Stem cell biology and gene therapy by Peter J Quesenberry, Gary Stain and Berard forget. ISBN 0-471-14656-0
- Lecture Notes on Molecular Medicine, Bradley J., Johnson D.& Rubenstein D., 2nd edition, published by Blackwell Science, 2001. **ISBN: 0632058390.**
- Principle of gene manipulation by Primrose, S. B. & Twyman R. M. & Old, R. W. 6th ed. Blackwell Science, USA. ISBN: 0-632-05954-0
- Principles of Genetics by Gardener, Eldon John., Simmons, Michael J., Snustad, D. Peter., 8th Edition, John Wiley & Sons Publications, New York.



ISBN: 9971-51-346-3.

- Principles of Genetics-Sinnot, Dunn & Dobzhansky, Tata-McGraw Hill India, New Delhi. ISBN: 978-0070994133
- Genetics 3rd Ed. By M. W. Strickberger, Prentice-Hall of India (P) Ltd, New Delhi, ISBN: 81-203-0949-9.
- Essentials of Human Genetics by S.M. Bhatnagar et al, 4th Edition, (1999), Orient Longman. ISBN: 81-250-1426-8
- ACT Cytogenetics Laboratory manual by Barch M. (Ed 1997) Lippincott-Raven. ISBN: 0881677744

