**MOLECULAR DIAGNOSTICS CREDIT HOURS 1+2**

**LEARNING OUTCOMES:**

**The students will be able to:**

1. Apply theoretical knowledge of DNA and RNA to molecular diagnostic procedures.
2. Identify the important parameters in the design of a quality system for molecular analyses.
3. Technically become good in handling techniques required to perform the most commonly used molecular diagnostics protocols.
4. Develop critical thinking skills to trouble shoot problems

**COURSE CONTENTS:**

Molecular Cytogenetics (FISH, ISH *etc*), DNA Microarrays and Genetic Testing, Mass Spectrographic Methods to Identify Disease Processes, Microorganism detection, High throughput sequencing, PCR Variants: Asymmetric PCR, multiplex PCR, degenerated primers, mutant primer, iPCR, RT-PCR· RAPD, AP-PCR, DAF, AFLP, cDNA-AFLP, (semi) quantitative PCR, Applications in microbiology, medicine, breeding, criminology, Protein-analysis techniques, Protein extraction, SDS-PAGE, Iso-electric focusing, 2D-gel electrophoresis, Western-analysis, ELISA, Immunolocalisation (incl, Detection techniques), RNA-extraction, Northern-analysis, Dot-blot, macro-en micro-arrays, In situ mRNA hybridization, DNA-hybridisation (Southern blotting, probe technology), RNA-analysis techniques, Light Cycler technology.

**PRACTICALS:**

1. All techniques can be practiced subject to the availability of facilities.
2. Visits to various diagnostic, pathology laboratories and/or research institutes.

**RECOMMENDED BOOKS:**

1. Buckingham et al., 2007. Molecular Diagnostics Fundamentals, Methods, and Clinical Applications. 1stEdition. FA Davis Publisher.
2. Cook, N., D'Agostino, M., & Thompson, K. C. (2015). Molecular microbial diagnostic methods: Pathways to implementation for the food and water industries. London, UK: Academic Press is an imprint of Elsevier
3. Debnath, M., Prasad, G. B. K. S., & Bisen, P. S. 2010. Introduction to Molecular Diagnostics. SpringerLink
4. Debnath, M., Prasad, G. B. K. S., & Bisen, P. S. 2010. Molecular diagnostics: Promises and possibilities. New York: Springer
5. DenieseD Wilson, 2008. Manual of Laboratory and diagnostic tests. McGraw Hills publisher.
6. Fischbach, F. T., & In Dunning, M. B. (2015). A manual of laboratory and diagnostic tests. Philadelphia : Wolters Kluwer Health

Lippincott. 2015. Carpenito Nursing Diagnosis + Fischbach a Manual of Laboratory and Diagnostic Tests, North American Ed. + Lippincott Nursing 2016 Drug Handbook. Lippincott Williams & Wilkins

**DIAGNOSTICS (1+2)**

**COURSE OBJECTIVES:**

To acquaint students with the molecular diagnostic techniques.

**COURSE CONTENTS:**

Molecular Cytogenetics (FISH, ISH etc), DNA Microarrays and Genetic Testing, Mass Spectrographic Methods to Identify Disease Processes, Microorganism detection, Pyrosequencing, PCR Variants: Asymmetric PCR, multiplex PCR, degenerated primers, mutant primer, iPCR, RT-PCR· RAPD, AP-PCR, DAF, AFLP, cDNA-AFLP, (semi) quantitative PCR, Applications in microbiology, medicine, breeding, criminology, Protein-analysis techniques, Protein extraction, SDS-PAGE, Iso-electric focusing, 2D-gel electrophoresis, Western-analysis, ELISA, Immunolocalisation (incl, Detection techniques), RNA-extraction, Northern-analysis, Dot-blot, macro-en micro-arrays, In situ mRNA hybridization, DNA-hybridisation (Southern blotting, probetechnology), RNA-analysis techniques, LightCycler technology.

**Practical:**

All techniques can be practiced subject to the availability of facilities.

**RECOMMENDED TEXT BOOKS:**

1. Gene Cloning and DNA analysis. 2006. T.A Brown Blackwell Publishing.
2. Molecular Diagnostics Fundamentals, Methods, and Clinical Applications 2007. Lela Buckingham and Muribeth L. Flaws. F.A Davis Publisher.
3. Medical Biomethods 2005. Handbook edited by John M Walker Ralph Rapley Humana Press.
4. Mitochondrial DNA methods and protocols 2009. Jefferey A. Stuart. Humana Press.
5. Manual of Laboratory and diagnostic tests 2008. Deniese D Wilson. Mc Graw-Hills publisher.

Manual of Diagnostic Antibodies for immunohistology 1999. Anthony S-Y leong. Greenwich Medical Media Limited. Oxford University Press