

*subject* **Systems Biology of Cancer**

(modeling of cancer cells)

*co-ordinator* prof.dr. J. Lankelma

*period* May 2009

*aim* In this graduate course the topology of cellular regulatory networks will be identified ("who talks to who?"), especially those interactions which are corrupted in cancer. The student will get acquainted with kinetics of biochemical reactions and how those influence the properties of cellular regulatory networks. Insight into quantitative analysis of networks will be obtained, both from combined modeling and experimental perspective. The students will increase their insight into mechanisms of cellular and supracellular decision making leading to cancer.

*content* Starting from a bachelor level knowledge on cellular biology this course will focus on the analysis and the consequences of molecular interactions in networks. Such networks have systemic properties, which do not result of single biochemical reactions but rather emerge from their joint activities. Interesting and profound systemic properties are for instance "toggle switches" or binary cellular decisions, e.g. for apoptosis, angiogenesis or cell division. Computer models will be designed during the course, that allow for "*in silico*" experiments in which we can vary biochemical parameters of biochemical reactions and study their effects on system properties. With such experiments we can perform network-based drug design and propose real world experiments to validate and refine our models and to learn more about the biology of cancer. For this process we will need quantitative data as readouts of the system. Insight in the required accuracy of data will be trained.

*form of tuition* During the morning sessions, lectures will be given by experts in their field. In the afternoon there will be practical computer modeling sessions using existing models and on modeling design.

*literature* Course literature consists of documents provided by the teachers.

*mode of assessment* The students will be offered a test with open theoretical questions as well as computer modelling tasks.

*target audience* This an optional course for masters (not advised for students that have followed the FALW bachelor's course "Integrative Tumour Cell Biology").

*remarks* The student should be interested in basic mechanisms of cancer (treatment) as well as working with computers. Some basic computer experience is essential (e.g. familiarity with Excel).

Apply per email to the course coordinator: [jan.lankelma@falw.vu.nl](mailto:jan.lankelma@falw.vu.nl)