Syllabus Major 220 : Track SBSPH	
Module 220	**Decision analysis in Public Health**
Module Coordinator	Dr. Mark H. Eckman University of Cincinnati Email: eckmanmh@ucmail.uc.edu
Dates	From December 5th to 9th 2016
Crédits/ECTS	3 (1 ECTS = 25h student's work)
Duration	Number of days: 5 (Number of hours (in-class and outside of class): 75
Module description	The course provides an introduction to methods and applications of decision analysis and cost-effectiveness analysis in medical decision making. Both lectures and workshop/lab sessions will review basic principles of decision analysis and will be organized into a number of units including: • Fundamentals of Building Decision Models • Assessment of Patient Values and Quality of Life • Bayes' Rule and ROC Analysis • Deterministic Sensitivity Analysis • Fundamentals of Cost-Effectiveness Analysis
Prerequisites	Basic statistical methods and economic evaluation methods; **Windows-based computer is needed to use decision modeling software!**
Course Learning Objectives	Through lectures, hands-on computer lab exercises, readings, discussions, and course projects participants will be able to: 1. Demonstrate the ability to critically appraise and interpret decision and cost-effectiveness analyses published in the literature. 2. Demonstrate knowledge of the symbolic notation used to develop decision simple decision tree models. 3. Perform a "fold-back" of simple decision trees to calculate the expected utility of each strategy and explain which strategy is "best." 4. Use decision analytic software and spreadsheets to calculate the base case results of decision models, perform sensitivity analyses, and interpret the meaning of these results. 5. Apply knowledge of decision analysis fundamentals to develop decision analytic models capturing diagnostic and/or treatment issues in clinical medicine or within other relevant area of professional practice (e.g., environmental sciences, public health and policy). 6. Apply the knowledge of probability theory and Bayes' Rule to interpret the meaning of diagnostic test results (e.g., true positives, false negatives, true negatives, false positives) 7. Explain the value of diagnostic tests with regards to their ability to discriminate between patients with and without disease, and describe how the test characteristics of diagnostic tests are used to develop receiver operator characteristic (ROC) curves 8. Explain the importance of area under the ROC curve in comparing different diagnostic tests. 9. Describe the relationship between the positivity criterion (or cutoff) used to interpret a diagnostic test result and the operating point on the ROC curve. 10. Use decision analytic framework to describe the optimal operating point on an ROC curve, with reference to the consequences of false positive and false negative test results, and the prevalence of disease 11. Demonstrate ability to interpret one-way, two-way, and three-way deterministic sensitivity analyses. 12. Explain the fundamental "Markovian Assumption." 13. Describe the differences between types of Markov models, including Markov Chains, Markov Cohort Simulations, and First Order Monte Carlo Markov models

UE Structure (details of sessions - title, speakers date, time)

Monday 30th November	Tuesday 1st December	Wednesday 2nd December	Thursday 3th December	Friday 4th December
9h -10h30 Lecture Introduction & Overview Designing and Evaluating Decision Trees Mark H. Eckman 10h50 – 12h30 Workshop Tree Construction & Fertilization Mark H. Eckman & Gwenaëlle Vidal-Trécan	9h -10h30 Workshop More Trees to Plant and Ponder Mark H. Eckman & Gwenaelle Vidal-Trécan 10h50 – 12h30 Lecture Bayes' Rule & the Interpretation of Diagnostic Tests Mark H. Eckman	9h Lecture & Workshop A Decision Analytic Approach to Determining the Optimal Operating Point on the ROC Curve Mark H. Eckman & Gwenaëlle Vidal-Trécan 10h50 – 12h30 Lecture Deterministic Sensitivity Analysis & Interpretation of Results Mark H. Eckman	9h Workshop Cost-Effectiveness Analysis Mark H. Eckman & Gwenaëlle Vidal-Trécan 10h50 Lecture Cost-Effectiveness Analysis - A detailed clinical example Mark H. Eckman	9h Lecture Markov Modeling -Tolls and tunnels 11h20 – 12h30 Lecture Probabilistic Sensitivity Analysis & Monte Carlo Simulation Mark H. Eckman
12h30: Lunch	**12h30: Lunch**	**12h30: Lunch**	**12h30: Lunch**	**12h30: Lunch**
14h Lecture Decision Modeling - A detailed clinical example Mark H. Eckman 15h30	14h Workshop Test Characteristics and Bayes' Rule Mark H. Eckman & Gwenaëlle Vidal-Trécan 15h50 Lecture Introduction to ROC Analysis Mark H. Eckman 17h30	14h Workshop Sensitivity Analysis Mark H. Eckman & Gwenaëlle Vidal-Trécan 15h50 Lecture Fundamentals of Cost-Effectiveness Analysis Mark H. Eckman 17h30	14h Workshop Patient Values & Preferences Hands-On Utility Assessment (The Gambler®) Mark H. Eckman & Gwenaëlle Vidal Trécan 16h20 Lecture Markov Modeling Mark H. Eckman 18h	14h Lecture Probabilistic Sensitivity Analysis & Monte Carlo Simulation Mark H. Eckman Evaluation of the course 16h

Course requirement	This course is organized around 6 fundamental topics or units. The general format entails didactic sessions followed by hands-on laboratory sessions during which students are given the opportunity to gain a more concrete appreciation of the underlying concepts and the available software tools. Collaboration in small groups during the workshop sessions is highly encouraged. Readings and other course materials are available electronically on the website and should be read as each unit is covered. Familiarizing yourself with the materials before lectures and workshops is highly encouraged. Students are also encouraged to continue working on laboratory/workshop exercises at home. **Windows-based laptops are needed to run decision modeling software**.
Grading and assessment	Final exam 100% grading
Location	George Sand EHESP Paris campus
Readings	*See materials on the website.*