



## CHIM3330 Chimie physique avancée

[22.5h] 2.5 crédits

Ce cours bisannuel est dispensé en 2006-2007, 2008-2009,...

**Enseignant(s):** Jacques Vandooren (coord.)

Langue d'enseignement : français

Niveau : Troisième cycle

### Objectifs (en termes de compétences)

Enseignement de troisième cycle à périodicité bisannuelle destiné aux étudiants désireux d'acquérir une spécialisation en physico-chimie des solutions en milieu non-aqueux

### Objet de l'activité (principaux thèmes à aborder)

Le contenu de cet enseignement diffèrera d'année en année. Il introduira au cas particulier des solvants non-aqueux en abordant différents aspects de la chimie et de la physico-chimie de ces systèmes : structure, thermodynamique, acidobasicité, oxydoréduction, propriétés de transport,.... Les principales applications de ces milieux seront illustrées.

### Résumé : Contenu et Méthodes

Cours : Energy and Environment - the Future of Combustion and Combustion Chemistry Energy Conversion and Propulsion.

Enseignant : Frederick DRYER (22,5 h)

The intent of the course would be to give an overview of the energy/environment area, and in particular the role that combustion will play in energy conversion over this century, the constraints that air emission controls place on energy conversion efficiency, how these interactions occur in classical and advanced energy conversion/propulsion systems, the role of improving abilities to model real fuel combustion chemistry in controlling particulates/NOx. The lectures would provide how these models are developed, where the holes are in detailed description, how these holes are investigated, what validation experiments are necessary, how they are modeled, how mechanisms are analyzed and improved, and how descriptions are minimized/optimized and reduced dimensionally so as to be applied in systems design. What will control the material will likely be the need for some overview of engineering issues in fluids/thermo necessary to bring these subjects to a point that those taking the course can be up to speed on the necessary background.

Contenu du cours :

Energy Conversion and Propulsion, the Role of Combustion, and Chemical Kinetics in Advancing Efficiency/Emissions

Fundamental issues in Modelling Reaction Chemistry for Energy Conversion and Emissions Applications

Measurements and Modelling of Elementary Reactions, and Reaction Systems

Methodologies and Approaches for Model Validation and Simplification

Some Modern Examples of Engineering Design Applications to advanced Energy Conversion and Propulsion Systems.