课程名（Coursename）  
Supramolecular Chemistry and Self-Organisation  
  
课程代码（Coursenumber）  
L2  
  
课程对象（Audience）  
Graduates  
  
开课教师（Teacher）  
Dr J. Nitschke  
  
学期（Semester）  
  
课程描述（Description）  
Physical laws can direct the flow of matter toward a more organised state. One particular strand of matter that began to organise itself chemically over 3 billion years ago started down the road to Darwinian evolution, eventually leading to the emergence of multicellular organisms such as the one reading this text. This course covers fundamental aspects and selected recent advances in the broad area of synthetic self-organising chemical systems and supramolecular chemistry, leading in to how self-organisation may be employed as a ‘bottom-up’ construction technique for nano-scale systems and devices.  
1–6 Fundamentals. Thinking “beyond the molecule” – the sense behind “supramolecular”. Thermodynamics and equilibria. Structural and spectroscopic characterisation methods for large and complex architectures. Non-covalent interactions: hydrogen bonding, metal-ligand, aromatic (\_ – \_), cation – \_, van der Waals, donor–acceptor. Dynamic covalent linkages. Building blocks, host-guest chemistry. Dynamic combinatorial chemistry  
7–12 Complexity and Function. Molecular topology and entanglements. Molecular machines, energy transduction. Molecular switches and sensors. Maxwell’s Demon, summoned. Reactions within container molecules and supramolecular catalysis. Self-replication. Supramolecular polymers. Complexity and emergence. The interface with biology.  
  
课时信息（Totalhours）  
  
教参信息（Textbookinfo）  
Aspects of Molecular Computing: Essays Dedicated to Tom Head on the Occasion of His 70th Birthday (Lecture Notes in Computer Science) - Paperback (Feb. 20, 2004) by Natasha Jonoska, Gheorghe Paun, and Grzegorz Rozenberg  
ISBN-13: 978-3540207818  
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