课程名（Coursename）
Chemistry in the Atmosphere

课程代码（Coursenumber）
B4

课程对象（Audience）
Undergraduate

开课教师（Teacher）
Prof J. A. Pyle and Dr M. Kalberer

学期（Semester）
M 6–8 & L 1–3

课程描述（Description））
This course will introduce key ideas about the chemistry of the atmosphere. It will discuss the chemical processes which control the abundances of ozone, and other trace constituents in the troposphere, and the rather different chemistry of the stratospheric ozone layer. We will use examples to reinforce ideas about reaction rates, gas and solution phase kinetics and spectroscopy.
Topics The physical and chemical structure of the atmosphere: composition and temperature as a function of pressure. Sources, sinks and variability. The concept of lifetimes and steady state. The role of ozone in the atmosphere. Chemistry of the stratospheric ozone layer. The Chapman reactions. Catalytic cycles for ozone
destruction and the idea of ‘families’, including NOx, HOX, ClOx. Chemistry of the troposphere. Local air quality. Oxidizing and reducing smogs, photochemical oxidants. The role of nitrogen oxides and volatile organics. The global troposphere. Production
and destruction of ozone. The role of OH. Sulphur compounds and acid rain Reactions of atmospheric interest. Some important gas phase atmospheric reactions will be considered in detail. Unexpected pressure and temperature dependencies in reactions involving complexes; organic reactivity; non-Arrhenius behaviour: Ozone photolysis – O 1D quantum yields; reactions in liquid droplets and on solid surfaces;.
Measurements of atmospheric composition and their applications. Remote sensing. Rovibrational spectroscopy. Ultraviolet spectroscopy. Laser studies of the atmosphere. Chemical methods: chemiluminescence, laser induced fluorescence. Electrochemical methods.

课时信息（Totalhours）

教参信息（Textbookinfo）
1 Chemistry of the Upper and Lower Atmosphere: Theory, Experiments, and Applications by Barbara J. Finlayson-Pitts and James N. Pitts Jr. (Hardcover - Nov. 24, 1999)
ISBN-13: 978-0122570605
2 Atmospheric Chemistry by Richard P. Wayne and Ann M. Holloway (Hardcover - Apr. 1, 2010)
ISBN-13: 978-1847558077
世界各地拥有馆藏的图书馆（OCLC）:39
3 Chemistry of Atmospheres: An Introduction to the Chemistry of the Atmospheres of Earth, the Planets, and their Satellites by Richard P. Wayne (Paperback - Mar. 30, 2000)
ISBN-13: 978-0198503750
4 Chemistry in the Marine Environment by R.E. Hester and R.M. Harrison (Paperback - June 8, 2000)
ISBN-13: 978-0854042609
5 Reactive Halogen Compounds in the Atmosphere (The Handbook of Environmental Chemistry / Air Pollution) by Peter Fabian and Onkar N. Singh (Hardcover - May 14, 1999)
ISBN-13: 978-3540640905
6 Aeronomy of the Middle Atmosphere: Chemistry and Physics of the Stratosphere and Mesosphere (Atmospheric and Oceanographic Sciences Library) by Guy P. Brasseur and Susan Solomon (Hardcover - Dec. 14, 2005)
ISBN-13: 978-1402032844
世界各地拥有馆藏的图书馆（OCLC）:136
7 The Chemistry of the Atmosphere: Oxidants and Oxidation in the Earth's Atmosphere by A. R. Bandy (Hardcover - Jan. 1995)
ISBN-13: 978-1855737983
8 The Atmosphere: Treatise on Geochemistry, Volume 4 by Ralph K. Keeling (Paperback - July 4, 2006)
ISBN-13: 978-0080450919
世界各地拥有馆藏的图书馆（OCLC）:236
9 Handbook of Weather, Climate and Water: Atmospheric Chemistry, Hydrology and Societal Impacts by Thomas D. Potter and Bradley R. Colman (Hardcover - July 15, 2002)
ISBN-13: 978-0471214892
世界各地拥有馆藏的图书馆（OCLC）:363
10 An Introduction to Environmental Chemistry by Julian E. Andrews, Peter Brimblecombe, Tim D. Jickells, and Peter S. Liss (Paperback - Dec. 30, 2003)
ISBN-13: 978-0632059058
世界各地拥有馆藏的图书馆（OCLC）:477