Enquiry for Course Details

CHEM4144 Advanced materials (6 credits)		Academic Year	2023
Offering Department	Chemistry	Quota	30
Course Co-ordinator	Dr E C M Tse, Chemistry < ecmtse@hku.hk >		
Teachers Involved	(Dr E C M Tse,Chemistry) (Dr K Okuro,Chemistry)		
Course Objectives	This course is a continuation from Introduction to Materials Chemistry. It provides a more comprehensive overview on materials chemistry and application of materials in advanced technology. The most recent development in materials chemistry will also be discussed.		
Course Contents & Topics	This course covers both hard and soft materials in the macroscale and nanoscale regimes for renewable energy, catalytic devices, sustainable resourcification, wearable biosensors, nanoelectronics, membrane technology, and other specialty applications. Advanced materials synthesis and characterization methods are also introduced.		
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 describe the preparation methods of 2D and 3D materials CLO 2 identify morphology-performance relationship in nanomaterials CLO 3 demonstrate knowledge in advanced materials characterization techniques CLO 4 understand the working principles of materials for real-life applications		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM3143		
Course Status with Related Major/Minor /Professional Core	2023 Major in Chemistry (Disciplinary Elective) 2023 Major in Chemistry (Intensive) (Core/Compulsory) 2023 Minor in Chemistry (Disciplinary Elective) 2022 Major in Chemistry (Disciplinary Elective) 2022 Major in Chemistry (Intensive) (Core/Compulsory) 2022 Minor in Chemistry (Disciplinary Elective) 2021 Major in Chemistry (Disciplinary Elective) 2021 Major in Chemistry (Intensive) (Core/Compulsory) 2021 Minor in Chemistry (Disciplinary Elective) 2020 Major in Chemistry (Disciplinary Elective) 2020 Major in Chemistry (Intensive) (Core/Compulsory) 2020 Minor in Chemistry (Disciplinary Elective) 2019 Major in Chemistry (Disciplinary Elective) 2019 Major in Chemistry (Intensive) (Core/Compulsory) 2019 Minor in Chemistry (Disciplinary Elective)		
Course to PLO Mapping	2023 Major in Chemistry < PLO 1,2,3,4 > 2023 Major in Chemistry (Intensive) < PLO 1,2,3,4 > 2022 Major in Chemistry < PLO 1,2,3,4 > 2022 Major in Chemistry (Intensive) < PLO 1,2,3,4 > 2021 Major in Chemistry < PLO 1,2,3,4 > 2021 Major in Chemistry (Intensive) < PLO 1,2,3,4 > 2020 Major in Chemistry < PLO 1,2,3,4 > 2020 Major in Chemistry (Intensive) < PLO 1,2,3,4 > 2019 Major in Chemistry < PLO 1,2,3,4 > 2019 Major in Chemistry (Intensive) < PLO 1,2,3,4 >		
Offer in 2023 - 2024	Y 2nd sem	Examination	May
Offer in 2024 - 2025	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough knowledge and understanding of essential facts, concepts, principles, and theories relating to frontier approach in polymer synthesis, properties, application, and characterization of materials for advanced technology. Show strong ability to apply and integrate knowledge and theory relating to the synthesis and applications of advanced materials. Show strong ability to analyze novel problems and critical use of data and experimental results to draw appropriate and insightful conclusions relating to advanced materials synthesis and their properties.
B	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to frontier approach in polymer synthesis, properties, application, and characterization of materials for advanced technology. Show evidence to apply and integrate knowledge and theory relating to the synthesis and applications of advanced materials. Show evidence to analyze novel problems and correct use of data and experimental results to draw appropriate conclusions relating to advanced materials synthesis and their properties.
C	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, and theories relating to frontier approach in polymer synthesis, properties, application, and characterization of materials for advanced technology. Show evidence of some abilities to apply and integrate knowledge and theory relating to the synthesis and applications of advanced materials. Show ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to draw appropriate conclusions relating to advanced materials synthesis and their properties.
D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to frontier approach in polymer synthesis, properties, application, and characterization of materials for advanced technology. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the synthesis and applications of advanced materials. Show limited ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to draw appropriate conclusions relating to advanced materials synthesis and their properties.
Fail	Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles, and theories relating to frontier approach in polymer synthesis, properties, application, and characterization of materials for advanced technology. Show little or no evidence of abilities to apply and integrate knowledge and theory relating to the synthesis and applications of advanced materials. Show little or no ability to analyze problems to most familiar situations and erroneous use of data and experimental results to draw appropriate conclusions relating to advanced materials synthesis and their properties.

Course Type

Lecture-based course

Course Teaching & Learning Activities

Activities	Details	No. of Hours
Lectures		36
Tutorials	or discussion	12
Reading / Self study		100

Assessment Methods and Weighting

Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
Assignments	Literature (Article / Patent)	30	CLO 1,2,3,4
Examination	Exam / Presentation	50	CLO 1,2,3,4
Test	Test / Project	20	CLO 1,2,3,4

Required/recommended reading and online materials

Specialist references will be given throughout the course.

Course Website

NIL

Additional Course Information

NIL