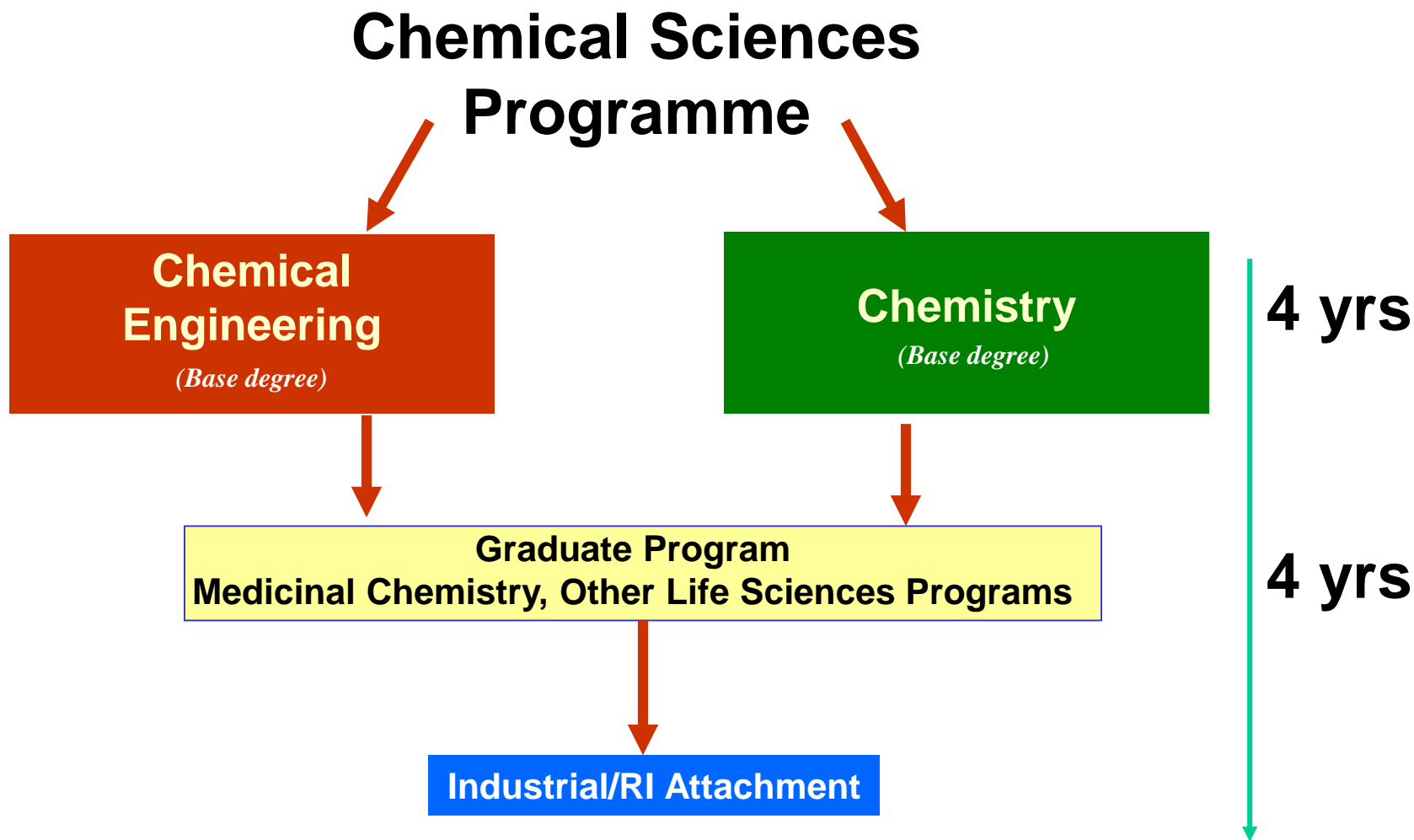


Chemical Sciences Programme NUS

**(Joint Effort by Office of Life Sciences, Department of Chemistry
and Department of Chemical & Biomolecular Engineering)**

Objective

To provide students with a strong and broad foundation in **life and chemical sciences** in their undergraduate studies, leading to a graduate program and research in interdisciplinary areas such as medicinal chemistry, and other approved life sciences-related graduate programs



Chemical Engineering Core

LSM Modules
6-7 core (24-28 MCs)

Chemistry Modules
4 core (16 MCs)

Choose 3 from the 6 optional modules

Modules at Different Levels

Level 1

Chemical Engineering Principles

General Biology (if no A-level Biology)
Molecular Cell Biology

Organic Chemistry for Engineers

Level 2

Chemical Kinetics & Reactor Design
Chemical Engineering Thermodynamics
Fluid Mechanics
Heat & Mass Transfer
Chemical Engineering Lab I

Metabolism & Regulation
Molecular Mechanics
Cell Biology
Genes and Genomes
Laboratory Techniques in Life Sciences

Organic Chemistry
Analytical Chemistry 1

Level 3

Fluid-Solid Systems
Process Dynamics & Control
Separation Processes
Process Safety, Health and Environment
Process Modeling & Numerical Simulation
Chemical Engineering Lab II
Chemical Engineering Lab III

Protein Structure & Function (elective)
Fundamental Pharmacology (elective)
Molecular Basis of Human Diseases
(elective)
Microbiology (elective)

Organic Synthesis & Spectroscopy

Level 4

B.Eng Dissertation or 2 ChE TEs
Process Synthesis and Simulation
Final Year Design Project

Toxicology (elective)
Drug Discovery & Clinical Trials (elective)

Chemical Sciences Program – BEng (Chemical)

Summary of Module Requirements and Credits

University Level Requirements	Faculty Requirements	Major Requirements	Unrestricted Electives
20 MCs	11 MCs	111 MCs	20 MCs
Total : 162 MCs			

Details in Annex B



Microsoft Word
Document

The NUS Chemical Sciences Programme : Total MC = 162-166



* Students may have to rearrange the modules to meet time-tabling constraints

A Possible Study Plan for Chemical Sciences Program*

Semester 1 (20-24 MCs)	Semester 2 (24 MCs)	Semester 3 (20 MCs)
ES1531 Critical Thinking & Writing (4)	GE on QR (4)	CN2121 Chemical Engineering Thermodynamics (4)
CM1501 Organic Chemistry for Engineers (4)	CM2121 Organic Chemistry (4)	CN2122 Fluid Mechanics (4)
ES1102 English	LSM1106 Molecular Cell Biology (4)	LSM1102 Molecular Mechanics (4)
IT1005 Introduction to Programming with Matlab (4)	MA1506 Mathematics II (4)	LSM2211 Metabolism and Regulation (4)
MA1505 Mathematics I (4)	MLE1101 Intro Materials Science and Engrg (4)	LSM2191 Laboratory Techniques in Life Sciences (4)
GE on HC (4) or CN1111 Chemical Engineering Principles (4)	CN1111 Chemical Engineering Principles (4) or GE on HC (4)	
LSM1301 General Biology (4) - if no A-Level Biology		
Semester 4 (21 MCs)	Semester 5 (19 MCs)	Semester 6 (19 MCs)
CN2108 Chemical Eng Lab I (2)	CN3108 Chemical Engineering Lab II (4)	CM2142 Analytical Chemistry 1 (4)
CN2116 Chemical Kinetics and Reactor Design (4)	CN3121 Process Dynamics and Control (4)	LSM2232 Genes and Genomes (4)
CN2125 Heat and Mass Transfer (4)	CN3132 Separation Processes (4)	LSM2233 Cell Biology (4)
CN3124 Fluid-Solid Systems (3)	CN3135 Safety, Health and Environment (3)	GE on T&E (4)
ES2331 Communicating Engineering (4)	CN3421 Process Modeling & Numerical Simulation (4)	EG2401 Engineering Professionalism (3)
GE on SS (4)		
Semester 7 (19-22 MCs)	Semester 8 (17-20 MCs)	*Electives (choose 3): LSM3211 Fundamentals Pharmacology LSM3224 Molecular Basis of Human Diseases LSM3231 Protein Structure & Function LSM3232 Microbiology LSM4211 Toxicology LSM4221 Drug Discovery & Clinical Trials
CN4118 B.Eng. Dissertation (7) or ChE Technical Elective (4) (related to Biomolecular Engineering)	CN4118 B.Eng. Dissertation (1) or ChE Technical Elective (4) (related to Biomolecular Engineering)	
CN4122 Process Synthesis and Simulation (3)	CN4123R Final Year Design Project (6)	
CM3221 Organic Synthesis & Spectroscopy (4)	*LSMx2xx Elective 2 (4)	
*LSMx2xx Elective 1 (4)	*LSMx2xx Elective 3 (4)	
GE on Asking Questions (4)	CN3109 Chemical Eng Lab III (2)	

Minor in Life Sciences

Automatic attainment of minor upon completion of all minor requirements

Module Code	Title	MC	Prerequisites
Level 1000 Modules: Any 2 modules out of the 3 LSM modules			
LSM1102	Molecular Genetics	4	GCE 'A' level or H2 Biology or equivalent or LSM1301 or LSM1301FC or LSM1301X
LSM1106	Molecular Cell Biology	4	GCE 'A' level or H2 Biology or equivalent or LSM1301 or LSM1301X
LSM1105	Evolutionary Biology	4	GCE 'A' level or H2 Biology or equivalent or LSM1301 or LSM1301FC or LSM1301X
Level 2000 Modules: Any two LSM21xx/LSM22xx modules except LSM2288 and LSM2289 (For complete list of level-2000 LSM modules, please visit http://www.lifesciences.nus.edu.sg/info/LS_Minor.pdf)			
LSM2191	Laboratory Techniques in Life Sciences	4	LSM1102 or LSM1106
LSM2211	Metabolism and Regulation	4	LSM1106 (Preclusion: LSM2101)
LSM2232	Genes and Genomes	4	LSM1102 and LSM1106 (Preclusion: LSM2102)
LSM2233	Cell Biology	4	LSM1106 (Preclusion: LSM2103)
Level 3000 Modules: Any 2 LSM32XX modules except LSM3288 and LSM3289			

LSM3211 Fundamental Pharmacology

LSM3224 Molecular Basis of Human Diseases

LSM3231 Protein Structure & Function

LSM3232 Microbiology

To satisfy
Level 3000 requirement

ChBE Dept Electives

- B.Eng. Dissertation CN4118 (8 MCs) is now Optional
→ if want to take this module, select research topic related to Life/Chemical Sciences
- Alternative: 2 ChBE Technical Electives related to Biomolecular Eng

Biomolecular Engineering

Module Code	Module Title
CN4233R	Good Manufacturing Practices in Pharmaceutical Industry
CN4241R	Engineering Principles for Drug Delivery
CN4246R	Chemical and Bio-Catalysis
CN4247R	Enzyme Technology
CN4249	Engineering Design in Molecular Biotechnology
CN5172	Biochemical Engineering
CN5173	Downstream Processing of Biochemical and Pharmaceutical Products
CN5222	Pharmaceuticals and Fine Chemicals

Eligibility for admission to the Chemical Sciences programme

- Applicants must be full-time students majoring in Chemistry or Chemical Engineering in the Faculties of Science and Engineering respectively.

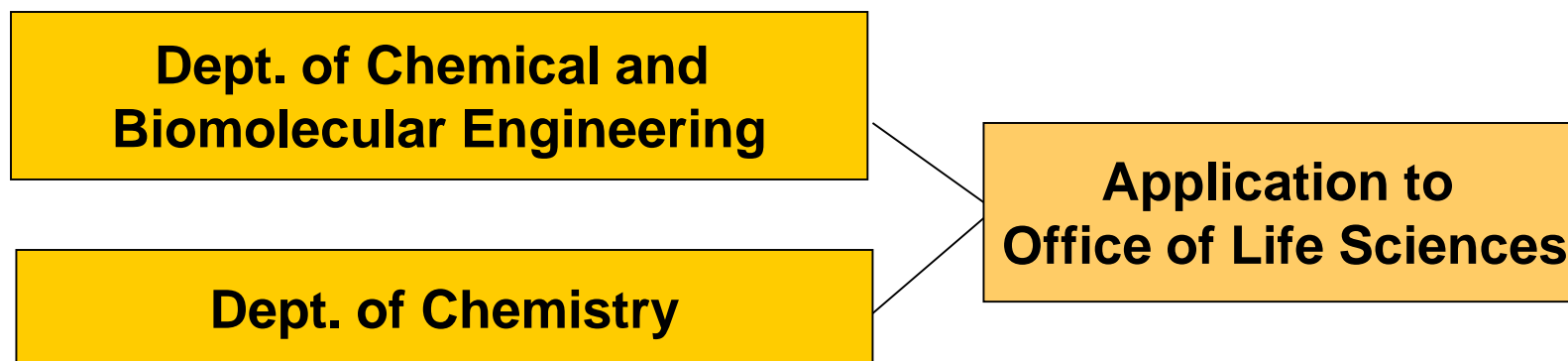
Criteria for selection

1. Good “A” Level results or equivalent
2. Interview/Essay test

Eligibility for Chemical Sciences Programme

Year	CAP score acceptable
Year 1	≥ 4.0
Year 2	≥ 4.0
Year 3	≥ 4.0
Year 4	≥ 4.0

Application Process



Application form and other information at
The NUS Chemical Sciences Programme website :

<http://www.chemicalscience.nus.edu.sg/>

Important Dates and Procedures for AY16/17 Application

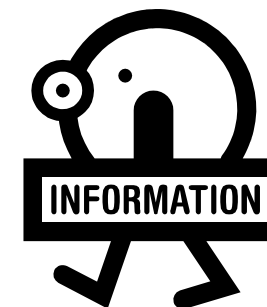
25 July - Briefing of Students

28 July - Deadline for application

29 July - Short listing of candidates

1 Aug- Announcement of successful candidates (e-mail)

3 August - Last day for acceptance/decline of place in programme



Modules to read in Semesters 1 & 2

Semester 1 (20-24 MCs)	Semester 2 (20 MCs)
ES1531 Critical and Thinking (4)	GE on QR (4)
CM1501 Organic Chemistry for Engineers (4)	CM2121 Organic Chemistry (4)
*ES1102 English	LSM1106 Molecular Cell Biology (4)
IT1005 Introduction to Programming with Matlab (4)	MA1506 Mathematics II (4)
MA1505 Mathematics I (4)	MLE1101 Intro Materials Science and Engrg (4)
GE on HC (4) or CN1111 Chemical Engineering Principles (4)	CN1111 Chemical Engineering Principles (4) or GE on HC (4)
LSM1301 General Biology (4) - if no A-Level Biology	

*For students who have not passed or been exempted from the Qualifying English Test at the time of admission to the Faculty

Q & A

