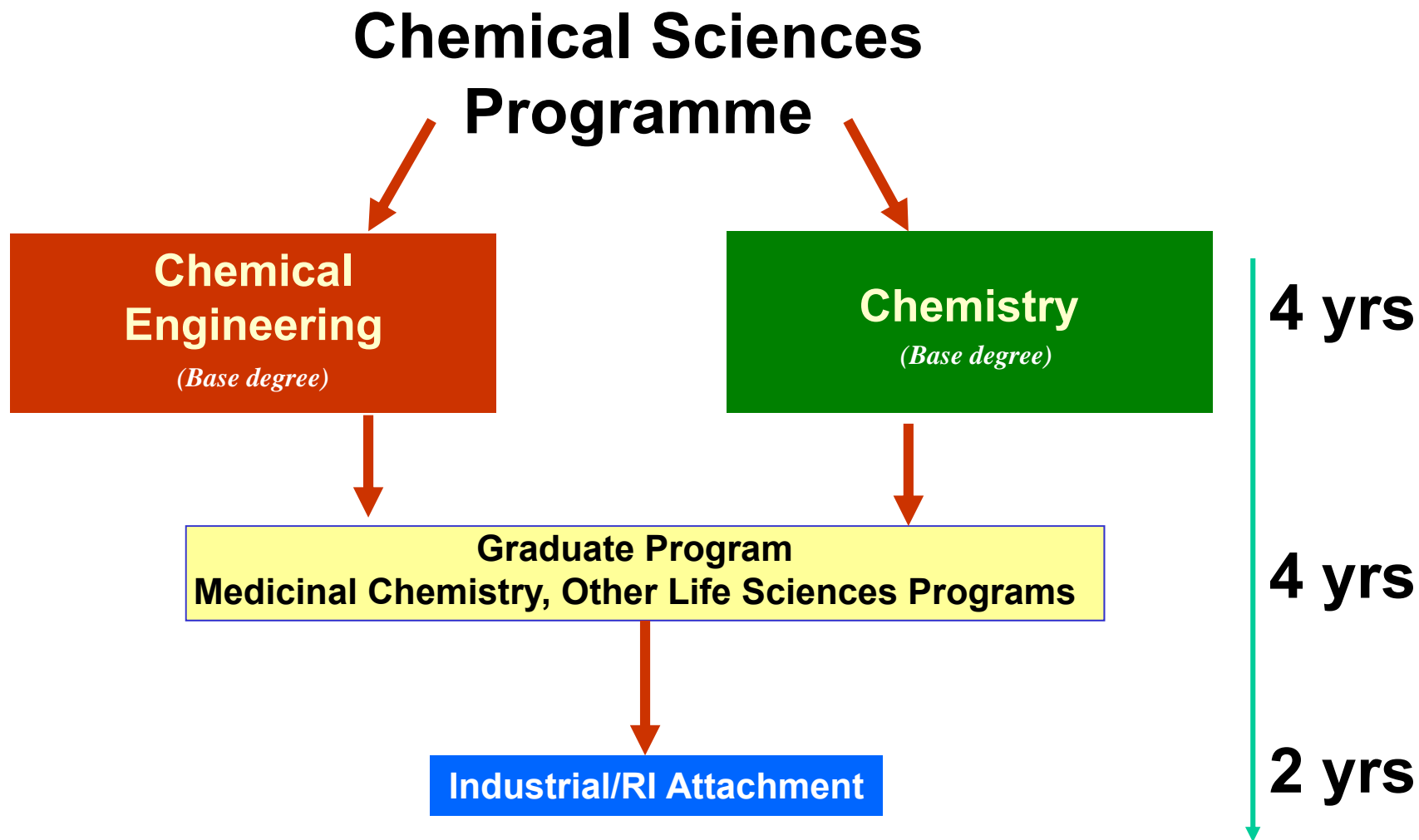


# **Chemical Sciences Programme NUS**

**(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**  
7 core (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)  
Biochemistry of Biomolecules

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  
Molecular Biology  
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	10 MCs	111 MCs	20 MCs
<b>Total : 161 MCs</b>			

Details in Annex B



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# The NUS Chemical Sciences Programme : Total MC = 161-165



\* 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)
GE on QR or T&E (4)	GE on T&E or QR (4)	CN2121 Chemical Engineering Thermodynamics (4)
CM1501 Organic Chemistry for Engineers (4)	CM2121 Organic Chemistry (4)	CN2122 Fluid Mechanics (4)
ES1102 English	LSM1101 Biochemistry of Biomolecules (4)	LSM1102 Molecular Mechanics (4)
IT1005 Introduction to Programming with Matlab (4)	MA1506 Mathematics II (4)	LSM2101 Metabolism & 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)	LSM2102 Molecular Biology (4)
CN2125 Heat and Mass Transfer (4)	CN3132 Separation Processes (4)	LSM2103 Cell Biology (4)
CN3124 Fluid-Solid Systems (3)	CN3135 Safety, Health and Environment (3)	GE on Asking Questions (4)
ES2331 Communicating Engineering (4)	CN3421 Process Modeling & Numerical Simulation (4)	EG2401 Engineering Professionalism (3)
GE on SS (4)		
Semester 7 (18-21 MCs)	Semester 8 (17-20 MCs)	<b>*Electives (choose 3):</b> <b>LSM3211 Fundamentals Pharmacology</b> <b>LSM3224 Molecular Basis of Human Diseases</b> <b>LSM3231 Protein Structure &amp; Function</b> <b>LSM3232 Microbiology</b> <b>LSM4211 Toxicology</b> <b>LSM4221 Drug Discovery &amp; Clinical Trials</b>
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)	
HR2002 Human Capital in Organizations (3)	CN3109 Chemical Eng Lab III (2)	

# The NUS Chemical Sciences Programme



## Minor in Life Sciences

Automatic attainment of minor upon completion of all minor requirements

Module Code	Title	MC	Prerequisites
<b>Level 1000 Modules:</b> Any 2 modules out of the 4 LSM modules			
LSM1101	Biochemistry of Biomolecules	4	'A' level pass in Biology or equivalent or LSM1301
LSM1102	Molecular Genetics	4	'A' level pass in Biology or equivalent or LSM1301
LSM1103	Biodiversity	4	'A' level Biology or equivalent, or LSM1301
LSM1104	General Physiology	4	'A' level pass in Biology or equivalent, or LSM1301
<b>Level 2000 Modules:</b> Any 2 modules out of the 3 LSM modules			
LSM2101	Metabolism and Regulation	4	LSM1101
LSM2102	Molecular Biology	4	Read LSM1101 and LSM1102 and pass one of them
LSM2103	Cell Biology	4	Read LSM1101 and LSM1102 and pass one of them
<b>Level 3000 Modules:</b> 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

- Singaporean, Permanent Resident or Nationals of ASEAN countries
- Applicants must be full-time students majoring in Chemistry or Chemical Engineering in the Faculties of Science and Engineering respectively.

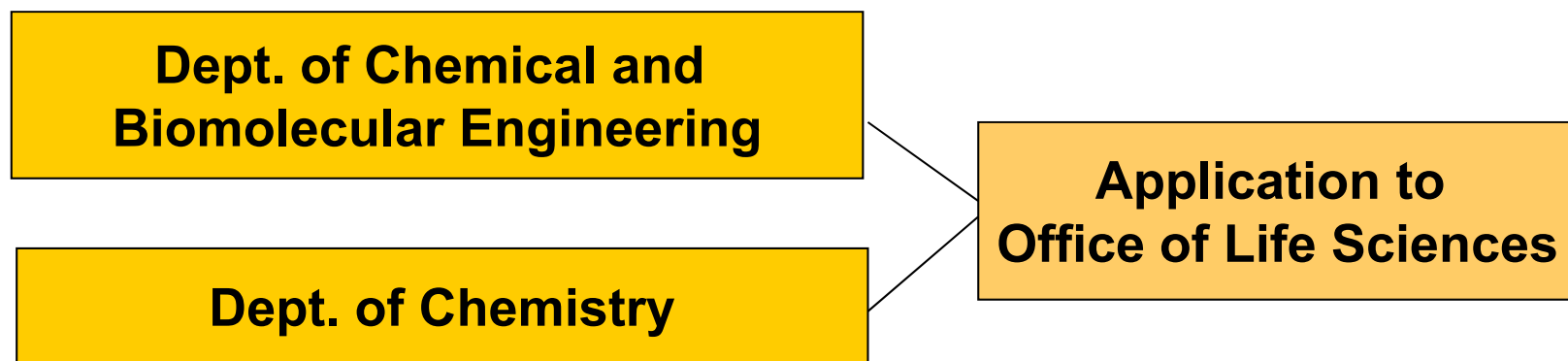
## Criteria for selection

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

## Eligibility for Chemical Sciences Programme

Year	CAP score acceptable
Year 1	$\geq 4.0$
Year 2	$\geq 4.0$
Year 3	$\geq 4.0$
Year 4	$\geq 4.0$

## Application Process



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

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

## Important Dates and Procedures for AY15/16 Application

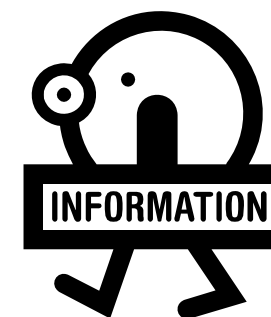
**24 July - Briefing of Students**

**29 July - Deadline for application**

**30 July - Short listing of candidates**

**31 July - 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)
GE on QR or T&E (4)	GE on T&E or QR (4)
CM1501 Organic Chemistry for Engineers (4)	CM2121 Organic Chemistry (4)
*ES1102 English	LSM1101 Biochemistry of Biomolecules (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

